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A Survey of Operating Inspection/Maintenance Programs

Radian Corp.
Austin, TX

Prepared for

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A SURVEY OF OPERATING INSPECTION/MAINTENANCE PROGRAMS

Final Report

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16. ABSTRACT

The U.S. Environmental Protection Agency has estimated that 28 states and the District of Columbia will need to implement vehicle Inspection/Maintenance (I/M) programs in order to comply with the Clean Air Act Amendments of 1977. In addition, several areas already have I/M programs. Each I/M program is unique. Its design is strongly influenced by the local economic and political factors and less so by the technical factors. However, in planning for an I/M program, there are basic issues that need to be addressed.

The main intent of this study is to provide state agency administrators and technical personnel with information which will aid them in the implementation of an inspection/maintenance program.

The report is divided into two sections: The first is a narrative discussion of the results of the survey. Section two contains tables that summarize the different aspects of an inspection/maintenance program.

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FOREWORD

This study was conducted for the Inspection/Maintenance Staff of the U.S. Environmental Protection Agency per EPA Contract 68-02-2538, Task 4. The main intent of the study was to provide state agency administrators and technical personnel with information which will aid them in the implementation of an inspection/maitenance program.

The report is divided into two sections: The first is a narrative discussion of the results of the survey, and all tables and figures within are referenced by a numeral 1 followed by the table number. Section two contains tables that summarize the different aspects of an inspection/maintenance program. These tables are referenced by a numeral 2 followed by the table number.

The data presented in the report are subject to change. For example, the emissions inspection requirements in Clark County, Nevada have just recently been changed from annual to change of ownership/new registered owner. Therefore, the appropriate sections in the text will be affected accordingly.

A SURVEY OF OPERATING INSPECTION/MAINTENANCE PROGRAMS

TABLE OF CONTENTS

Page

Acknowledgements i

Foreword ii

1.0 Introduction 1

2.0 General Description of the Operating Inspection/Maintenance Programs 2

- 2.1 Type of Program and Coverage 2
- 2.2 Enforcement 6
- 2.3 Inspection Costs 8

3.0 Operational Aspects of the Programs 12

- 3.1 Inspection Procedure 12
- 3.2 Tampering Inspections 16
- 3.3 Fleet Inspection 19
- 3.4 Failure Rate, Repair Costs, Refailure Rates, and Waivers 20
- 3.5 Personnel Requirements 25
- 3.6 Equipment Requirements 29
- 3.7 Land & Building Requirements 31
- 3.8 Summary of Incremental Costs 33
  - 3.8.1 Operating Cost 33
  - 3.8.2 Capital Cost 33

Page

4.0 Selection of Cut Points 38

4.1 Initial Selection of Cut Points 38
4.2 Revising the Cut Points 39

5.0 Data Collection and Analysis 42

5.1 Methodology and Reports 42
5.2 Hardware and Software Requirements 48

6.0 Quality Assurance 49

7.0 Training Programs 58

7.1 Inspector Training 58
7.2 Station Investigator Training 60
7.3 Mechanic Training 60

8.0 Public Information 64

8.1 Description of Programs 64
8.2 Public Response 69

9.0 Air Quality Improvements 72

LIST OF TABLES AND FIGURES IN SECTION ONE

TABLE	TITLE	PAGE
1.1	Description of Operating I/M Programs	4
1.2	Tampering Inspections	18
1.3	Failure Rate and Repair Costs	22
1.4	Emission Analyzers and Other Test Equipment	30
1.5	Data Collection	44
1.6	Data Analysis	45
1.7	Quality Assurance Programs	50
1.8	Training Programs	59
1.9	Public Information	65

FIGURE	TITLE	PAGE
1.1	Inspection Cost to Motorist	9
1.2	Incremental Operating Cost	34
1.3	Capital Costs	35
1.4	New Jersey Ambient Carbon Monoxide Air Quality and Motor Vehicle Gasoline Consumption	73
1.5	Composite Violations of 0.12 ppm Ozone Ambient Air Quality Standard for Bayonne Trailer, Camden Trailer, Ancora, Asbury Park, Somerville	74

SECTION TWO - SUMMARY TABLES

TABLE	TITLE	PAGE
2.0	Description of Operating I/M Programs	77
2.1	Vehicle Coverage	78
2.2.1	Personnel Requirements for New Jersey	79
2.2.2	Personnel Requirements for Cincinnati and Norwood	80
2.2.3	Personnel Requirements for Oregon	81
2.2.4	Personnel Requirements for Arizona	82
2.2.5	Personnel Requirements for California	83
2.2.6	Personnel Requirements for Nevada	84
2.2.7	Personnel Requirements for Rhode Island	85
2.3	Failure Rate and Repair Costs	86
2.4	Operating Costs	87
2.5	Capital Costs	88
2.6	Emission Analyzers and Other Test Equipment	89
2.7	Quality Assurance Programs	90
2.8	Training Programs	91
2.9.1	Training Details for New Jersey	92
2.9.2	Training Details for Oregon	93
2.9.3	Training Details for Arizona	94
2.9.4	Training Details for California	95
2.9.5	Training Details for Rhode Island	96
2.10	Data Collection	97
2.11	Data Analysis	98
2.12	Public Information	99
2.13	Tampering Inspections	100
2.14	Staff Contacts	101

1.0 INTRODUCTION

The United States Environmental Protection Agency has estimated that 28 states and the District of Columbia will need to implement vehicle Inspection/Maintenance (I/M) programs in order to comply with the Clean Air Act Amendments of 1977. The Amendments require that each state provide a State Implementation Plan (SIP) to show how it will meet the National Ambient Air Quality Standards (NAAQS). I/M has been included in many SIP's because it is a viable method of reducing hydrocarbon (HC) and carbon monoxide (CO) emissions. In addition, several areas already have programs. Mandatory I/M has been implemented in New Jersey, Ohio (Cincinnati and Norwood), Arizona (Pima and Maricopa counties), Oregon (metropolitan Portland), Nevada (Clark and Washoe counties), Rhode Island, and California (the South Coast Air Basin).

Each I/M program is unique. Its design is strongly influenced by the local economic and political factors and less so by the technical factors. However, in planning for an I/M program, there are basic issues that need to be addressed: What type of test should be implemented? What are the personnel requirements? What types of public information programs need to be set up? It is useful to study the existing I/M programs and see how these and other issues have been addressed. Such an interchange of information allows I/M program planners to employ to a maximum extent those approaches which have been found to be successful in other programs.

2.0 GENERAL DESCRIPTION OF THE OPERATING I/M PROGRAMS

Inspection/Maintenance (I/M) is an air pollution control strategy that involves measuring the tailpipe emission levels of vehicles and requiring the repair of vehicles that exceed certain levels. The main purpose of an I/M program is to identify and repair vehicles that are violating the Federal emissions standards. Since the Federal Test Procedure (FTP) takes considerable time and requires the use of complex equipment, the identification of these vehicles is currently accomplished through testing while the engine is idling (idle test), with additional testing using other engine operating modes being performed in some programs. Although idle mode emissions do not correlate well with FTP emissions, the idle test has been shown to be effective in identifying those vehicles that are grossly violating the Federal emissions standards. Since these are the vehicles that contribute the most to pollution from mobile sources, I/M has been effective in reducing vehicular emissions.

2.1 Type of Program and Coverage

There are three basic types of I/M programs: centralized state-operated, centralized contractor-operated and decentralized. In centralized programs the tests are conducted in centrally located lanes, while in decentralized programs the inspections are conducted in licensed private garages. New Jersey's program is a centralized state program operated by the Department of Motor Vehicles and the Department of Environmental Protection. The emission inspection was added to a pre-existing safety inspection program at the state stations and about 3,800,000 vehicles are covered. The emissions inspection was also added to an existing safety inspection in Cincinnati, a centralized program run by the city that inspects about 150,000 vehicles per year. Oregon's program is a centralized, state-operated program, although it is confined to metropolitan Portland and does not involve a concurrent safety inspection. About 500,000 vehicles are covered by the Oregon program. The programs in Arizona and California are centralized programs administered by the state but operated by a contractor (Hamilton Test Systems in both cases). Each covers about 1.2 million vehicles. The Nevada and Rhode Island systems are decentralized; that is, they are administered by the state but conducted by private garages throughout the administered area. Rhode Island's involves about 500,000 vehicles and Nevada's, about 330,000. The Rhode Island program was added to a pre-existing safety inspection at the garages. A description of the operating I/M programs is presented in Table 1.1.

The geographic area of an I/M program usually encompasses all the nonattainment areas for oxidants (and/or possibly carbon monoxide), as defined by EPA under the Clean Air Act Amendments of 1977. A nonattainment area is a region with proven violations of the National Ambient Air Quality Standards (NAAQS) for a given pollutant or pollutants. In some programs, this is only a portion of the state's boundaries (Portland, Oregon, and the current programs in Arizona and Nevada are examples.) In others, most of the state is classified nonattainment (New Jersey and Rhode Island.) Although other nonattainment areas exist in California, California chose to implement I/M first in the Los Angeles area (South Coast Air Basin) because of the severity of the air pollution problem there. Cincinnati (including Norwood) instigated an I/M program in 1975 as a result of an EPA recommendation following the rejection of Ohio's State Implementation Plan (SIP). (The exact geographical coverage of each of the existing I/M programs is presented in Table 1.1.)

All of the programs inspect light-duty vehicles (passenger cars and pickup trucks) and some inspect heavy-duty vehicles as well. (See Tables 1.1 and 2.1.) Arizona is the only program which covers all types of vehicles (heavy-duty gasoline and diesel vehicles, regardless of weight, and motorcycles) except for those over 13 years old. New Jersey, Cincinnati, Nevada, Rhode Island, and California exclude all diesels;

TABLE 1.1 DESCRIPTION OF OPERATING I/M PROGRAMS

ITEM	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	NEVADA	RHODE ISLAND	CALIFORNIA
Geographic Location	Entire State	Cincinnati & Norwood, Ohio	Portland	Pima and Miracopa Cty.	Clark and Washoe Cty.	Entire State	South Coast Air Basin (LA Area)
Date of Inspection							
Mandatory	Feb. 1, 1974	Jan. 1, 1975	July 1, 1975	Jan. 1, 1977 Mandatory repairs Jan. 1, 1976 Mandatory Inspec. Voluntary repairs	Ch. of Owner 7-1-74 + New Regis. Owner 7-1-77 Annual (Clark Only) Jan, 1. 80	Jan. 1, 1979	Mar. 19, 1979
Voluntary	July 5, 1972					Nov. 1, 1977	
Coverage (LDV-Light Duty Vehicle)	All LDVs less than 6000 lbs GVW	All LDVs less than 6000 lbs 160,000 vehicles	All vehicles 500,000 vehicles	All vehicles 1,200,000 vehicles	All LDV's less than 6000 lbs GVW. 330,000 vehicles	All LDVs less than 8000 lbs GVW. 500,000 vehicles	All LDV's less than 8500 lbs GVW. 1,200,000 vehicles
Exemptions	Diesels, vehicles less than 50 cu. in., pre 68 2 stroke Saabs, new cars for first 2 years.	Diesels (emissions only). Motorcycles, Historical veh's (over 25 years, collectors item)	HDV diesels over 8500 lbs GVW, motorcycles farm plated vehicles, fixed & restricted load vehicles. Interstate vhls	Vehicles over 13 years old. Prorated vehicles (Interstate vehicles)	65 and over 13 years old. Prorated vehicles (Interstate vehicles)	Diesels, new vehicles for 12 months or 12,000 miles. Farm vehicles over 25 years old, motorcycles	Diesels, motorcycles, dual fuel or complete fuel conversions
Type of Program	Centralized-State Oper.	Centralized-City Oper.	Centralized-State Oper.	Centralized-Contractor-Oper.	Decentralized - Private Garage	Decentralized - Private Garage	Centralized-Contractor
Administrating Agency	DMV/ N.J.D.E.P.	Cinn. Dept. of Sewers	Ore. D.E.Q.	Bur. of Veh. Emission Inspec., Div. of Environ. Health Services	D.M.V.	R.I.D.O.T.	Bur. Auto Repair/ Air Res. Board
Number of Inspection Stations	38 stations 68 lanes 4736 reinspection sta.	Cinc. - 1 Station, 4 lanes Norwood - 1 station, 1 lane	7 stations 14 lanes (1 state owned, 6 leased)	12 stations 36 lanes 1 mobile facility	90 in Washoe, 165 garages in Clark	Licensed 900 private garages	15 permanent 2 mobile 46 lanes
Can Fleets Self Inspect?	No	No	Yes 50 stations	Yes 300 stations	Yes (Incl. above)	Yes (Incl. above)	Yes 799 stations
Inspection Frequency	Annual	Annual	Biennial-LDV's Annual-HDV's	Annual	Change of Owner/Annual (Clark Cty Only)	Annual	Change of Owner/ New registered owner
Inspection Modes							
Idle HC & CO	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail[1]	Pass/Fail	Pass/Fail	Pass/Fail
2500 RPM HC & CO			Condition Veh/ Data Collection		Condition Veh/ Data Collection		Collection Veh/ Data Collection
Loaded HC & CO				Condition Veh/ Data Collection			Planned
NO_x							Planned
Exhaust Dilution (CO_2)	Planned		Pass/Fail (8%)	Pass/Fail (4.5%)			Pass/Fail (4.5%)
Idle Speed			Pass/Fail		Check & Adjust		Pass/Fail
Diagnostics or other Engine Parameters					Check & Adjust		
Smoke	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail (HD diesel only)	Pass/Fail	Pass/Fail	Pass/Fail
Tampering			Pass/Fail		Pass/Fail		Pass/Fail
Safety	Pass/Fail	Pass/Fail				Pass/Fail	
Enforcement/Fines	Sticker & Registration $100 max.	Sticker Cinc. $11-35 Norwood $15	Registration $100 max	Registration $8 late regis.	Registration Up to 6 mo. and $500	Sticker - Road Checks $15	Registration finable offense (variable)
Reinspection	At lanes or Licensed Private Reinspection Stations	At Lanes	At Lanes	At Lanes	Vehicle Adjusted when inspected 96% pass	At Garages	At Lanes
Hours of Station Operation	8-5 M-F some Saturday and nights	8-7 M-F	8-6 Tues - Sat	Metro 8 - 3:30 - MWF 8 - 7:00 - T-Th	Varies for Garages	Varies for garages. Challenge station open 7:30 - 3:30 M-F	Flexible - usually 8-4:30 T - F 8-7:00 M
Waiting Times (Max, Avg.)	Avg-6 min. Max-15 Min.	Usually no wait	Avg-10 min (varies greatly thru year) Max - 30 min	Avg-10 min Max - 1 hr. Wait info. available by Phone	Customer usually leaves car	Customer usually leaves car	Avg-10-15 min. Max - 1 hr + Wait info. avail. by phone
Queing Lengths	-		-	-	-	-	7 car min.
Inspection Time	5-10 min. 1 min for emissions	3-5 min.; 45 seconds for emissions.	3-5 min.	5 min	20 min	30-60 min. including safety	6 min
Inspection Cost	$2.50 (incl. safety) $1.00 for reinspection at private garages	$3.75 (incl. safety) Free retests	$5.00 Free retests	$5.00 incl. one free retest	$12.50 - 17.00	$4.00 including safety	$11.00 $7.00 reinspection

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[1] Transmission in Drive (neutral on manual transmission)

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Oregon excludes diesels over 8,500 pounds gross vehicle weight (GVW) although all heavy-duty gasoline-fueled vehicles are tested. Other specific exceptions are listed in the table.

Usually, inspections are required of vehicle owners each year. Oregon does this for heavy-duty vehicles, but is unusual in requiring a biennial inspection for light-duty vehicles (beginning after two years of registration).* New Jersey also does not require an inspection for the first two years of registration, but requires an annual inspection thereafter. In addition to its annual inspection requirement, Arizona also requires an inspection whenever the title to a vehicle changes hands, except for auctions and sales between private individuals. Washoe County, Nevada requires tests only when the vehicle is being registered for the first time; however, Clark County requires an annual test as of January 1, 1980. California has not yet gone to an annual inspection requirement. Currently, tests are required only with a change of owner or with a new owner registration.

Five of the existing programs allow for inspection of vehicle fleets by the fleet owner. Of these, Oregon is the most strict on minimum fleet size requirements (requires the largest number of vehicles to be defined as a fleet). A minimum of 100 vehicles is required for non-governmental fleets and 50 vehicles for governmental fleets. Resale fleets (i.e., car dealerships) are not permitted to conduct their own inspections. California plans to tighten its fleet inspection allowances when its program goes to an annual inspection format. The section on Operational Aspects contains more details on fleet inspections.

All of the programs enforce carbon monoxide (CO) and hydrocarbons (HC) in an idle mode (this is accomplished by inserting a probe into the vehicle's exhaust pipe while the engine is idling (600-1200 rpm)). However, some programs feature other test modes as well. Oregon, Nevada, and California measure the pollutants at a high idle mode (approximately 2500 rpm) for data collection purposes and to condition the vehicle for the idle test. Arizona uses dynamometers to test vehicles in a loaded mode (both low and high cruise tests) for vehicle conditioning and data collection. The loaded test also has the potential for measuring oxides of nitrogen (NO_x) emissions. California plans to begin loaded-mode testing at a future time for this reason.

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*In Oregon, heavy-duty vehicles have annual registration while light-duty vehicles are biennial.

Oregon, Arizona, and California monitor carbon dioxide (CO_2) levels during the test to check for excessive exhaust dilution. Excessive dilution occurs when the probe is improperly inserted or the vehicle has exhaust leaks. New Jersey plans to add this feature to its test in the future. Oregon and California also monitor idle speed and will fail vehicles if this is excessive. Nevada includes a check and adjustment of the following vehicle parameters: idle speed, dwell, and timing. The idle and 2500 rpm emission levels are recorded both before and after the adjustments.

All of the programs have a visual smoke test as part of the inspection. (Arizona's smoke test is only for heavy duty diesel vehicles.) Visual inspections, to determine if tampering with the emission control devices has occurred (tampering inspection), are performed in Oregon, Nevada, and California. When California begins a loaded mode test with measurement of NO_x, it plans to discontinue its visual inspection because tampering failures will be distinguished by the emissions test.

2.2 Enforcement

Enforcement for the I/M programs is usually through issuance of windshield stickers or vehicle registrations, which then can be monitored by the local or state police. The exact type used by each existing program and the maximum fine for non-compliance or expired inspection is listed in Table 1.1. In all of the areas except Cincinnati and Rhode Island, compliance with the emission standards is a prerequisite for motor vehicle registration. Non-compliance in Oregon is a Class C misdemeanor and is subject to fines of up to $100.00. Nevada also classes violation as a misdemeanor, subject to a $500.00 maximum fine and up to six months in jail. However, in Arizona motorists who do not receive a certificate of compliance and thus are denied registration are subject only to an $8.00 late registration fee. Violators in California are also subject to a fine. In New Jersey the registration card is only valid with the inspection stamp and a sticker is issued for compliance. Violators can be fined $100.00 for the first offense and $200.00 for the second. Stickers are also used by the Cincinnati program. Within the Cincinnati city limits, the fines for violation range between $11.00 and $35.00. In Norwood, they are set at $15.00. Stickers are issued in Rhode Island and roadside checks are sometimes used as additional deterents against violations. Two classes of penalties have been established, depending on the degree of non-compliance. Minor violations are cited with a minor defect offense (for safety or emissions). For this the fine is set at $15.00. Major violations are classed as operation of an unsafe vehicle and can result in sentences up to one year in jail.

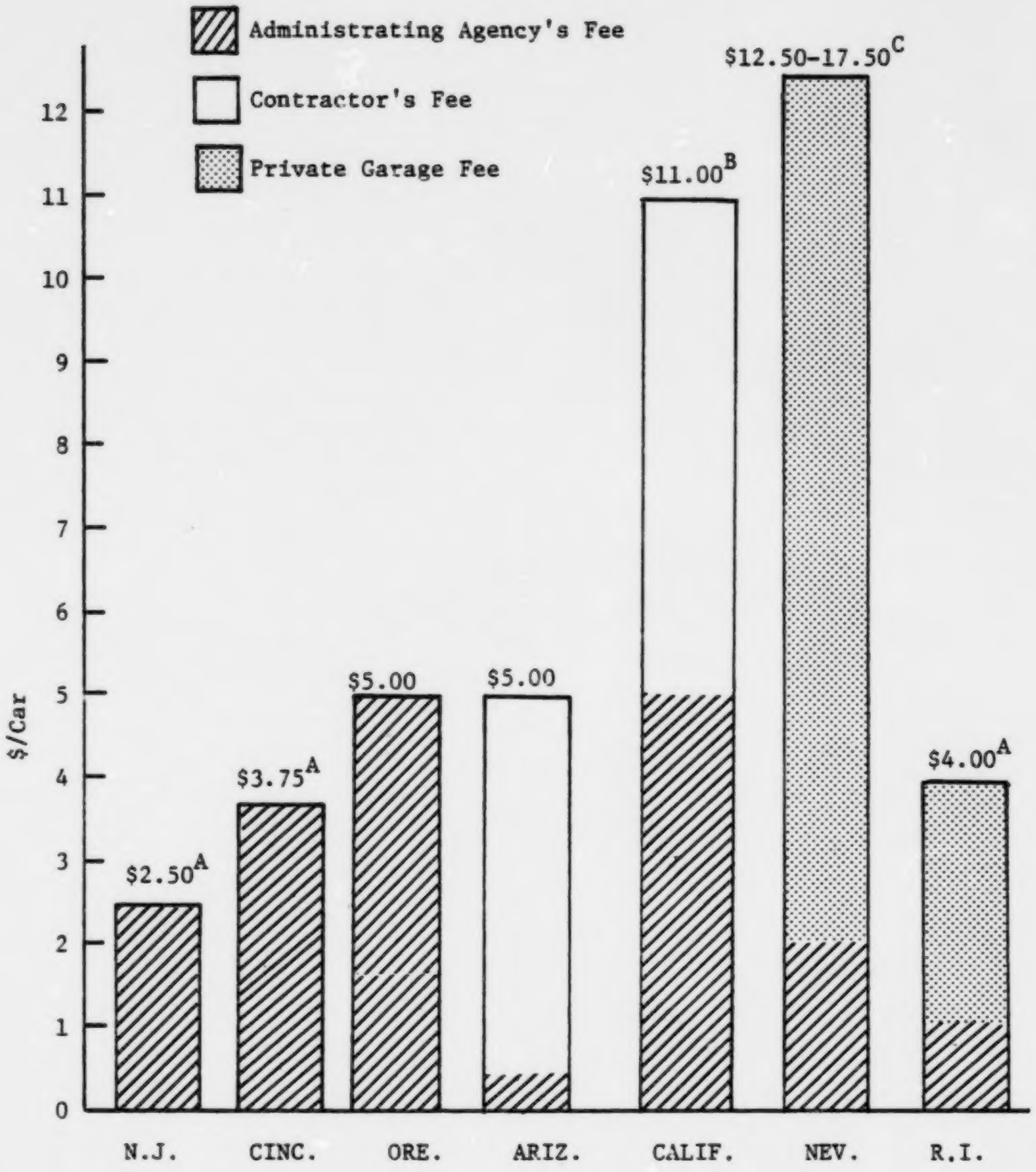
Enforcement problems predictably vary considerably from one area to another. No significant problems have been reported in either New Jersey or Rhode Island. The only problem reported in Oregon is the influx of vehicles from Vancouver, Washington, where inspection/maintenance is not currently required. Some thought has been given to the idea of requiring Washington motorists who work in Portland to comply with the requirements of Oregon's I/M program (and vice versa, when the State of Washington enacts an I/M program), but this now seems an unlikely prospect.

Cincinnati and Norwood have always had significant enforcement problems and have historically had a compliance rate of less than 50 percent. This was true even before the emission test was added to the safety test. To make matters worse, the State of Ohio has changed the registration such that there is no way of distinguishing vehicles of Hamilton County (which contains these cities) from the rest of the Ohio vehicles. Furthermore, the Cincinnati police force has been cut back drastically in personnel. As a result of these events, compliance in Cincinnati this year is down 35 percent from 1976 levels. This low compliance rate is creating serious cash flow problems which is endangering the inspection program in these two cities. Cincinnati and Norwood are currently making attempts to improve this situation and may begin to require an inspection sticker on vehicles that use city parking lots.

Arizona officials report some non-compliance -- people driving unregistered vehicles. Possibly the low penalty for late registration is part of the problem. Nevada's annual program in Clark County has not been active long enough to judge how well people will comply with it. However, there does seem to be a widespread notion among drivers there that they do not need to have their vehicles inspected in order to be registered. Nevada did not report problems from the change of owner and new registered owner programs. California has not reported any significant enforcement problems, but then the program there has not yet reached the annual registration phase.

2.3 Inspection Cost

As shown in Figure 1.1, costs for the existing I/M programs vary considerably, from a low of $2.50 in New Jersey to a high of $12.50 to $17.50 in Nevada. Nevada's fee includes the inspection and correct readjustment of certain engine parameters, when necessary. New Jersey's fee is collected as part of the registration fee and includes the safety inspection as well. If retests are conducted at licensed private garages, there



A - Includes Safety

B - $7.00 fee for retests

C - Includes parameter adjustment

FIGURE 1-1 INSPECTION COST TO MOTORIST

is an additional fee of $1.00. Cincinnati and Oregon are also inexpensive and allow unlimited free retests. Arizona allows one free retest. The contractor collects the $5.00 inspection fee at the Arizona stations and forwards all the funds to the state. The state then pays the contractor $4.75 per paid test. The fee in Nevada is collected by the private garages which then pay the state $2.00 per test. Rhode Island's $4.00 fee is collected at the private garages and, like the New Jersey inspection, includes safety as well. Rhode Island's garages pay the state a fee of $1.00 per test. California's contractor system is relatively expensive at $11.00 for the initial test and $7.00 for each retest and, like Arizona, the fees are collected by the contractor. The contractor's portion of the fee is between $4.49 and $6.70 per test, depending on how many emission tests are conducted. It should be noted that the lowest fees were in areas that had existing safety programs.

In all the programs except for Rhode Island and Cincinnati the administrating agencies' fees are sufficient to cover their expenses, and some of the programs actually generate additional revenue for the state. New Jersey collects $12,800,000 from vehicle inspections while the annual operating expense (including safety) is $10,500,000. The funds are placed in the New Jersey State treasury and operating expenses must be funded through appropriations. In California the contractor is currently paid the maximum fee of $6.70 per car. Of the remaining $4.30, one-half is used to cover the expenses for the program and the other half is used as payments for a loan that was secured to build pilot test facilities. Initially retests were free, however, the $7.00 retest fee was implemented to provide the state with adequate operating funds since in California the contractor is paid for each test (whether it is the initial or retest).

Arizona, Nevada, and Oregon use the fees of the administrating agencies as sources of operating revenue and as reserves to cover the expenses during periods when the revenues are reduced. For example, in the early years of the program Arizona's portion of the fee was considerably more than it is now, and in those years the state built up a surplus for vehicle inspections.* In 1980 Arizona expects to draw on this surplus to cover its expenses since the current fee of $.25 will not provide sufficient funds. Arizona plans to raise the inspection fee to provide the necessary revenue for future operations.

As mentioned, in Rhode Island and Cincinnati (including Norwood) the fees of the administrating agencies are not sufficient to cover the operating expenses. As a result these areas need additional funding to operate their programs. In Rhode Island the annual inspection fees, which total around $500,000, are deposited in the State General Fund and the $1,000,000 operating expenses are taken from the fund. In 1980, Cincinnati and Norwood are slated to receive $160,000 from EPA to provide necessary operating revenue. However, this funding is temporary, and in the future these programs hope to obtain the necessary revenues through improved enforcement and/or the state of Ohio.

*In Arizona and California the contractor's fee is tied to an escalation clause. The contractor will receive a fee increase if the local cost of living exceeds 8 percent per year.

3.0 OPERATIONAL ASPECTS OF THE PROGRAMS

3.1 Inspection Procedure

Many of the programs conduct the actual inspection in a similar fashion. California's procedure will serve as an example. When a motorist drives into an inspection center, at the first position pertinent vehicle data such as vehicle identification number and engine size are obtained by the inspector and entered into a computer. The computer provides the inspector with information regarding the emission control or retrofit devices which should be present on any particular vehicle.* The inspector uses this information to perform an underhood tampering inspection to check for missing or disconnected emission control devices. (Details on tampering inspections are presented in the next section.) The results of the inspection are entered by the inspector into the computer. About two minutes are required for this phase.

At the second position, a probe is inserted into the vehicle's tailpipe to test the exhaust emissions at idle, high idle (2500 rpm), and idle again. (In California, the high idle check is usually only used if the vehicle exceeds the standards on the low idle test.) These data are automatically entered into the computer as the test is conducted and compared with the standards for that category of vehicle. The lower of the two idle readings are used for compliance. In addition, the inspector performs a visual smoke check at this point. About two minutes is required for this step. The vehicle then advances to the third position where the computer printout of the inspection report and the certificate (if the vehicle has successfully passed the inspection) are received. If the vehicle failed the inspection, the computer will also furnish, on the inspection report, test

*Some cases require more detailed vehicle identification factors to determine the necessary emission control devices. Therefore, each test site has a manual that lists the control systems for each engine.

and diagnostic information to aid in vehicle repair. This phase of the inspection procedure requires about one minute.

If a vehicle fails the emission test, three options are available to the owner. He or she can:

1. Repair the vehicle.
2. Bring the vehicle to a Qualified Mechanic for repair.
3. Bring the vehicle to a Qualified Mechanic who is also a licensed Motor Vehicle Pollution Control (MVPC) Mechanic.*

In either of the first two cases, the vehicle must be repaired until it passes inspection. If the third option is selected, the Qualified MVPC Mechanic will certify, by signing the back of the inspection form, either that the recommended repairs, including a low-emissions tune-up, were performed or that the recommended repairs would exceed the appropriate repair cost limits. (These are discussed in more detail in the section following on repair costs and waivers.) If the vehicle fails the retest the motorist would then qualify for a Certificate of Waiver.

In test organization and the handling of data, Arizona's program is very similar to the California inspection. However, Arizona does not use an initial underhood tampering inspection and it performs a loaded-mode test (run on dynamometers) instead of a high idle test. Also, Arizona's low idle test is conducted in Drive, as opposed to Neutral in California. Like the high idle test, the loaded test helps to condition the vehicle for the idle test and provide additional diagnostic information for repair purposes. Both low and high cruise tests are usually run, although a customer may elect to have only the idle test performed. Failed vehicles go to private mechanics for service (no licensed mechanics are available, unlike California) and then return to the inspection stations for retests. The first retest in Arizona is free of charge and follows the same procedure as the initial emission inspection. Vehicles which fail the first retest are frequently given waivers (see section 3.4 for details). The amount of time required for Arizona's inspection is about five minutes.

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*Legally, all paid emission adjustments and repairs must be performed by Qualified or Qualified MVPC mechanics. Other non-certified mechanics are not allowed to make these repairs for compensation.

In test philosophy, Oregon's inspection is also similar to the California program. Oregon, however, uses an entirely manual data collection and handling system. Thus, vehicle identification data and tampering problems must be verbally transmitted from the inspector doing the hands-on vehicle inspection to the inspector who is operating the analyzer and transcribing data from it. Data from the analyzer must also be manually compared to the particular standards for that vehicle type by the same person. Consequently, there is the potential for errors in more steps of the inspection process than in the California and Arizona test protocols, especially during rush periods. The total time required for the inspection is only three to five minutes.

Inspectors in Oregon are instructed not to give diagnostic advice to motorists (usually there is no time for this, nor are inspectors trained with this in mind). The inspection forms have diagnostic suggestions printed on the back, but basically the burden for correcting emission problems falls completely on the mechanic. Failed vehicles go for maintenance to private garages or dealerships and then are brought back to the inspection stations for reinspection. The same procedure is followed for the initial inspection and all subsequent ones. Retests are free -- a possible problem in the view of some local observers because it is perceived that this tends to encourage simple screwdriver adjustments by backyard owner-mechanics who hope to pass the test and then readjust the vehicle afterwards. Without free retests these owners might instead take their vehicles to a repair garage that has better equipment and better-trained mechanics; these owners could, of course, still readjust the vehicle afterwards.

In the Nevada program, idle and 2500 rpm emission levels are checked and recorded initially. Then the vehicle is adjusted to specifications, including adjustment of the following vehicle parameters: idle speed, dwell, and timing. A tampering inspection is included and most of the garages also adjust the idle air/fuel mixture if the vehicle fails the standards. The vehicle is then probed again. If at this point the vehicle does not pass the inspection, further repairs may be required before it is given a waiver. Usually about 20 minutes is required for this procedure. The inspectors at the garages fill out the inspection forms manually as the tests proceed. Approximately every month state officials visit the garages to check analyzer calibration, etc. At this time they collect the forms and take them back to the Department offices where the data are keypunched and input to the computer. A formal description of the inspection procedure is presented in the Appendix, page E-6.

The I/M programs in New Jersey, Cincinnati, and Rhode Island differ most widely from the other programs described above because their emission tests were added to existing safety inspections and from a time standpoint the safety aspects still dominate. In New Jersey, when a vehicle comes in for the emission/safety inspection, the emission test is conducted first. The inspector obtains the vehicle model year from the registration and enters it into the analyzer. Then, when the vehicle is probed, a bulb on the analyzer will light up if the standards for that model year are exceeded. The test itself consists only of an idle check and a visual smoke inspection. However, a check on the level of CO_2 (to detect excessive exhaust dilution) is planned in New Jersey. Total time for the test is 5-10 minutes, with the emissions inspection consuming only about one minute of that.

Failed vehicles in New Jersey may either go to private facilities for repair and then for retests, return to the state lanes, or they may go to licensed private reinspection stations. At the state lanes, extra analyzers are located at the end of the regular lanes to handle reinspections. The private reinspection station program was established to reduce the load at the state lanes. Under this program, a motorist whose car fails the test has the option of having the car repaired and reinspected at a licensed reinspection station. About 55 percent of the motorists whose cars fail the initial test elect this option. Another program change to reduce the reinspection load at state lanes was the elimination of certain non-critical safety rejections (such as license plate lights) and instead, merely advising the motorists of the problems.

Cincinnati's procedure is similar to that of New Jersey but is more basic. There is no bulb to indicate failures and all retests are at the lanes (i.e. no reinspection stations).

Because Rhode Island's program is conducted by private garages without direct state supervision, there is no standardization of operating procedures and very little data are available on such topics as failure rate and amount of repair costs. The basic test is a safety inspection with an idle emission test, and normally, any repairs necessary to bring the vehicle into compliance are conducted at the time of the inspection. Total time for the test is usually between 30 and 60 minutes.

3.2 Inspection for Tampering

Proper operation of the emission controls is usually necessary for good drivability with low FTP emissions. In addition, some of the controls need to be operating in order to reduce NO_x emissions which are not detected by any of the existing tests. Inspection for tampering helps to insure that the emissions controls are operative. As mentioned, California, Nevada, and Oregon inspect vehicles for tampering. The items inspected are summarized on Table 1.2.

California performs a thorough tampering inspection as part of the MVIP. Inspectors look for disconnected or missing pollution control devices. In addition, a functional check is made on the exhaust gas recirculation (EGR) system by increasing the engine speed and looking for movement on the EGR valve stem. However this method is not totally reliable since some vehicles have mechanisms that disable the EGR systems during unloaded modes and other vehicles have valve stems which are not readily visible. A large percentage of vehicles are failed as a result of tampering and in some periods the tampering rejection rate is greater than the emissions rejection rate. (See Appendix, page C-11 for details.)

In Nevada, as part of the parameter inspection and adjustment, garages are required to make a tampering inspection to check that all of the required emission control devices are connected. Under some circumstances a motorist may be given a certificate of compliance if idle emissions meet the standards despite missing or inoperative pollution control devices (except for catalytic converters).

Oregon performs a tampering inspection while the hood is open to connect the sensors for the tachometer. The inspectors look for disconnected hoses and pulleys and/or missing controls, including the catalytic converter and fuel inlet restricter on vehicles for which they are required. Results indicate that thermostatic air cleaners are the most common items that are disconnected. Proper operation of the thermostatic air cleaner is helpful for smooth warm-up operation if the carburetor is tuned to manufacturer's specifications. The overall failure rate due to tampering is usually five percent or less.

TABLE 1.2 TAMPERING INSPECTIONS

	OREGON	CALIFORNIA	NEVADA
Components Inspected (V-Visual Check, F-Functional Check)			
Catalytic Converter	V	V	V
EGR Valve	V	F	V
Air Injection System	V	V	V
PCV Valve	V	V	V
Thermostatic Air Cleaner	V	V	V
Oxygen Sensor			
Fuel Fillerneck	V (plug on site)	V (unless locked)	
Limiter Caps			
Exhaust System Modifications	V	V	Has to meet specs for model year
Engine Modifications	V		
Inspector Training	Covered in a one week training program	Contractor trained inspectors. Fleet inspection stations must employ a qualified mechanic.	None

3.3 Fleet Inspection

The existing programs differ widely in their treatment of fleets. New Jersey takes the most restrictive approach -- no fleets are allowed from the standpoint of the emission inspection (there are allowances for heavy-duty fleets for the safety inspection). Cincinnati is another area that does not permit a fleet inspection.

The remaining programs provide for fleet inspection by the owner. In Arizona, registered owners and licensed automobile dealers with 25 or more vehicles may inspect their own vehicles, provided that they have a licensed inspector and a registered analyzer. The State conducts training sessions for the licensing and relicensing of fleet inspectors.

Oregon is more stringent on fleet size, requiring at least 100 vehicles for non-governmental fleets and 50 vehicles for governmental fleets. In addition, Oregon does not permit fleet inspection on resale fleets. Fleet inspection stations are routinely inspected by Oregon DEQ officials (once a month for analyzer calibration) and fleet inspectors must attend the DEQ inspector training program.

Nevada allows the fleet owners to inspect their vehicles in the same manner that the private garages inspect public vehicles. Fleet owners must meet the same licensing requirements as the licensed private garage inspection stations.

In Rhode Island, 10 or more vehicles qualify as a fleet. In order for them to be allowed to conduct self-inspections, fleet inspectors must meet the same qualifications as private garage inspectors. This has been a source of complaints by many of the fleets since they feel that they do not need the required training (see section 7.0).

California allows two types of fleet certification. The first type (MVIP fleet) allows owners (governments, public utilities, or private business) of fleets of 10 or more vehicles affected by the state inspection program to conduct their own inspections and issue certificates, subject to State surveillance. In addition, an MVIP fleet facility may inspect and test, not only its own resale fleet, but that of other dealers as well (providing that they maintain a stock of at least 10 vehicles at all times and obtain appropriate authorization from the Department). These other fleets are called Member fleets. The licensing of car dealers as MVIP fleets is expected to terminate when the annual inspection program begins.

California's MVIP fleets must meet strict equipment and personnel requirements. For instance, a mechanic must be employed who has been certified by the state as a Class "A" Motor Vehicle Pollution Control installer and as Vehicle Inspection Program "Qualified." State certificates of compliance must be purchased for issue to the inspected vehicles. An official description of the fleet requirements appears in the Appendix, pages C-39 to C-42.

3.4 Failure Rates, Refailure Rates, Repair Costs, and Waivers

The reported failure rates among the seven programs ranged from a high of 47 percent in California to a low of 18 percent in New Jersey and Cincinnati. New Jersey finds that approximately 12 percent of the vehicles inspected, or 1/3 of the failed vehicles, fail only for emissions (New Jersey also has a safety inspection). The failure rate in California for emission failures only was 27 percent; the 20 percent differences accounts for tampering and miscellaneous other causes. Oregon had a 40 percent initial failure rate. Nevada reported a 32 percent initial failure rate decreasing to 4 percent after minor adjustments had been made. Arizona had a 25 percent initial failure rate. Rhode Island data are problematic.

Although no official data exist, EPA obtained a figure of 21 percent for 1978. However, a study performed in September 1979 for EPA Region I included a survey of motor vehicle owners and only 4.5 percent of them reported that their vehicles had failed the emission inspection. Although the exact explanation for this discrepancy is not known, in part it may be due to garages making unreported repairs on the vehicles during the inspection. See Table 1.3 for a summary of the data presented in this section.

Refailure rates, interestingly, are much more uniform. Arizona reported the highest refailure rate, 34 percent, and Oregon the lowest, 23 percent. (Oregon does not keep track of retests; therefore, its refailure rate is based on random surveys.) California had 28 percent refailures and New Jersey had 29 percent. Nevada, because of the nature of its program, had no refailures. It seems that a fairly constant percentage of vehicles will be refailures, regardless of how an inspection program is designed or what standards are selected. This observation may be useful to those contemplating establishment or adjustment of waiver or retest provisions.

Repair costs also show considerable uniformity between the programs with some reports indicating that between 67 (New Jersey) and 80 (Oregon) percent of all necessary repairs cost less than $30.00. California reported the highest average repair cost ($32.00) and New Jersey the lowest ($18.71). However, in some of the private garage systems, minor repairs (e.g., air/fuel adjustments) are performed free of charge (this was reported in Rhode Island and Nevada, particularly).

In 1979 the Oregon DEQ performed monthly surveys of repair costs for failed vehicles. Most frequently (one-third to one-half of the time), the air/fuel mixture required adjustment. Other repairs or adjustments with significantly high rates of occurrence were: idle speed (10 to 15 percent), carburetor rebuild (usually about 10 percent), air cleaner replacement (5 to 10 percent), dwell/timing (5 to 10 percent), and spark plugs (5 to 10 percent). The surveys also indicated about half of the vehicles were

TABLE 1.3 FAILURE RATE AND REPAIR COSTS

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Failure Rate	18% (1979)	18% (1979)	40% (1979)	25% (1979)	47% (1979) 27% Emissions	32%(1978) - B 4%(1978) - A	Not Available
Refailure Rate	29% (1979)	Not Available	23% (1979)	34%(1979)	28% (1979)	Not Available	Not Available
Repair Cost	(1979)	Not Available		(1979)	(1979)	(1979)	
Median	$17		80% of repairs under $30				Not Available
Average	$18.71 (2/3 below $28)			$30	$32	$20.45	
Repair Cost After Refailure	Not Available	Not available	Not available	Not available	Not available	Not available	Not Available
Median							
Average							
Waivers							
Available?	Yes	No	No	Yes	Yes	Yes	Yes
Time Period	1 Year			1 Year	-	1 Year	1 Year
Stipulations	Motorist must document that a good faith effort was made to pass test.			Repair procedure, cost ceilings $25-67, $75 - 68-up	Repair performed by MVPC mech. cost ceilings. $50 (No ECS modif) Greater if veh. is modif.)	$25 parts ceiling, $75 parts & labor, (Not including catalytic converters) No missing converters	Motorist must make reasonable effort to pass - no visual tampering, parameters checked
Number (%)	Approx. 10/yr. 41 since the start of the program			Approx. 80,000 yr. (30% of failed veh)	Approx. 30,000/ yr (10% of failed veh.)	Approx. 5000 per year (2%)	None

A - After Adjustment B - Before Adjustment repaired for under $10.00. Oregon does not currently perform these surveys.

In several states, maximum repair costs and the availability of waivers are linked. Nevada, for instance, imposes a $25.00 ceiling on parts, and a $75.00 ceiling on parts and labor together (this does not include missing or defective catalytic converters). Vehicles which would exceed these limits are usually waived (reportedly about 2 percent of the vehicles examined).

Arizona also has cost limits: $25.00 for pre-1968 vehicles, and $75.00 for the more recent ones. Approximately 30 percent of the initial vehicle failures in Arizona received waivers in 1979 (80,000). Arizona also has a special provision for vehicles that fail only for CO. If a vehicle fails only for CO and is then repaired by a facility with a registered emissions analyzer, a retest is not necessary. The owner need only return the properly completed inspection form and the Certificate of Waiver is then mailed to him. Arizona issues about 2,000 such certificates per year.

Because of their mechanic training and certification program, California has a rather more complicated procedure for obtaining a waiver. If the customer elects to repair the vehicle himself or to bring it to a "Qualified Mechanic" for repair, it must be repaired and retested until it passes the emission inspection, regardless of how much time and money is involved. However, as an incentive for customers to use qualified "Motor Vehicle Pollution Control" mechanics, waivers may be obtained if one of these licensed mechanics certifies that the necessary repairs would exceed the appropriate cost limits and that the vehicle has received a low emission tune-up. (These are $50.00 for most failures; or in the case of modified, missing, or inoperative emisson control devices, $85.00 for 1955-65 vehicles, $150.00 for 1966-74 vehicles, or $250.00 for 1975 and later vehicles, each in addition to the normal $50.00 for routine repairs or a low emission tune-up.) These cost limits do not present a large barrier to the achievement of cleaner air, however. Studies have shown that 90 percent of the vehicles which initially failed the emission test and returned for a retest had been repaired within the cost limits. The other 10 percent (approximately 30,000 vehicles in 1979) were given waivers.

One particular type of waiver in California, an "ECS waiver," requires state approval. A motorist may receive an "ECS waiver" if a qualified MVPC mechanic certifies that the replacement of the necessary emission control devices will exceed the cost limits. However, to provide a check on the system, California requires that the mechanics phone in and obtain verbal approval from the State for all "ECS waivers." When the mechanics call the State and describe the missing equipment, the State determines what equipment should be replaced and tells the mechanics the code numbers that need to be entered into the inspection report. (See Appendix, page C-5). At times a state official will inspect the vehicle before approving a waiver. Additionally, the mechanics are required to send the State a copy of the inspection report. Approximately five percent of the waivers in California are "ECS waivers."

In New Jersey, waivers are available if the motorist can document that he has done all he can to try and pass the emission test despite the cost. The Department of Motor Vehicles (with the advice of the Department of Environmental Protection) grants about ten one-year waivers per year. These are almost always for high HC and are usually for exotic vehicles such as Ferraris.

Similarly in Rhode Island, the Director of the Department of Transportation may grant waivers after concluding that a reasonable effort was made to try to pass the emission inspection and if all emission control devices are connected. However, no waivers have been requested and there is no standard procedure for requesting them.

Two locations do not give waivers at all: Cincinnati and Oregon. Oregon officials, in fact, have gone to considerable lengths to demonstrate that their individual model type standards are reasonable. Rarely a question will arise involving an exotic car (e.g., a Ferrari) whose owner may be having difficulty meeting the standards, but experience has shown that if proper maintenance procedures and manufacturer-recommended emission control technology is followed, compliance is possible. However, there was one case of after-market turbocharging which was run through a Federal Test Procedure to qualify the equipment.

Problems can be foreseen for the policy of linking repair cost ceilings to the availability of waivers. First, because of the current inflationary state of our economy, repair costs are increasing faster than revisions in cost allowances. Furthermore, repair costs on the new emission control components are dramatically higher than for previous systems. For example, replacement of oxygen sensors costs a minimum of $28.00 plus labor, and adjustment of fixed carburetor settings costs $45.00 (in Arizona). The conclusion to be drawn seems to be that areas which are contemplating the establishment of an I/M program should allow for cost flexibility if waivers and costs are to be linked.

3.5 Personnel Requirements

The most significant costs in the program areas are usually for personnel, with the annual costs for personnel usually exceeding the total capital investments. Administrative personnel are needed in the different areas to manage the programs, handle complaints and other public information tasks, provide clerical and secretarial support, and perform other tasks such as planning. Technical personnel are used in many of the areas to perform training, provide diagnostic assistance, maintain and calibrate equipment, analyze data and evaluate the program. Enforcement personnel are needed to enforce the emission standards (i.e., inspectors) or perform surveillance on the test facilities. Personnel requirements including a breakdown of the different job classifications are summarized on Tables 2.2.1 through 2.2.7.

New Jersey already had an existing safety inspection run by the Department of Motor Vehicles (DMV). When the emission test was added to the safety test, the DMV continued to administer the inspection program and enforce the standards. However, the implementation of the emission test did result in a one range upward reclassification of all inspection jobs because of the increased technical content. The technical responsibilities of the I/M program were taken up by the newly created New Jersey Department of Environmental Protection (DEP). The DEP evaluates the program, calibrates the analyzers, and performs research and development functions such as setting or changing the emission standards. Later, the implementation of the private garage-operated reinspection program created the need for additional enforcement responsibilities which again were given to the DMV. DMV personnel were required to survey these stations and confirm that they were performing the inspections in accordance with the law. The DEP developed procedures that described how the reinspection stations should perform the calibrations and testing. In addition, the DEP developed the standards for the emission analyzers.

Despite the fact that Arizona is a contractor-operated system, there are significant manpower requirements to the State. Arizona did not have an existing safety inspection; therefore, there was not an existing organization to administer the I/M program. As a result, Arizona formed a new division in the Arizona Department of Health, the Vehicular Emissions Inspection Division which assumed most of the administrative, technical, and enforcement responsibilities. (The contractor, by the nature of the contract, is the prime enforcer of the emission standards.) The Vehicular Emissions Inspection Division performs a thorough overview of the program, auditing the contractor's charges to the state while providing other administrative services such as complaint handling. In addition, the division provides technical assistance (training for mechanics and the general public), vehicle diagnosis, data analysis, research and development, as well as enforcement. The division inspects government vehicles and it also surveys the fleet and contractor test facilities.

California is another contractor-operated system, but unlike Arizona it did not need to develop an organization to administer and enforce the program. California added the Motor Vehicle Inspection Program (MVIP) to the Bureau of Auto Repair (BAR) division of the Department of Consumer Affairs. Because of its involvement in California's decentralized tampering inspections (the Blue Shield program), the BAR was already familiar with some I/M-related programs. For several years the BAR has employed instructors, engineers, planners, and clerical and management personnel. However, the MVIP requires additional BAR personnel to survey the contractor and fleet operations, handle complaints, and provide regional managerial, clerical, and technical support. Considerable technical support is also provided by a separate organization, the California Air Resources Board (ARB). The ARB is responsible for setting standards, analyzing test data, and investigating I/M-related complaints that pertain to the automobile manufacturers.

The Oregon program is operated by the Oregon Department of Environmental Quality (DEQ). Although Oregon did not have an existing safety inspection, it chose to implement and operate a centralized state-run system. Consequently, there are considerable personnel requirements in the enforcement area where a large number of inspectors are needed. Because of Oregon's biennial inspection requirements, and the fact that in 1976 nearly all vehicles on the road started their two-year cycle at the same time, more inspectors are required in the even years than in the odd ones. (Of course, this situation will eventually even out as future registrations spread over the years, or if the program goes to annual inspections.) Therefore, inspectors are currently hired on a temporary basis in the heavy years and released, as needed, in the light years. Administrative personnel such as the station and general supervisors, are permanent DEQ employees. The DEQ also has engineers that perform technical tasks such as calibrating and repairing analyzers, collecting and analyzing data, writing reports, preparing materials and conducting training sessions, providing technical advice to the public, and making decisions about possible changes to the emission standards. DEQ personnel also perform random surveillance of the fleet stations.

The personnel who administer and enforce Nevada's I/M program are located in the DMV's offices in Reno and Las Vegas. Administrative and clerical personnel are needed to run the inspection offices, keypunch data from the forms, and provide assistance to people with complaints or problems. Enforcement personnel are mainly responsible for garage surveillance and investigations. Although the DMV's inspection departments do not have formal technical responsibilities, the program supervisors and the garage investigators provide diagnostic and other technical assistance. In addition, personnel at the DMV's headquarters in Carson City provide data processing as well as accounting assistance.

Since 1959 Rhode Island has had a decentralized safety inspection that was administered and enforced by the Rhode Island Department of Transportation (RIDOT). The addition of I/M did not greatly increase the personnel requirements for the RIDOT; the administrative and enforcement program aspects were already in place and few technical tasks are performed. At times, personnel in Rhode Island's Department of Environmental Management (DEM) will technically evaluate the program and make recommendations for improvements. However, the DEM has no legal authority to implement these recommendations.

Cincinnati and Norwood added the I/M test to their existing safety test. As a result, additional personnel were needed at the inspection lanes which are under the jurisdiction of the Cincinnati and Norwood Departments of Public Works. Hamilton County's air pollution control division is also involved with the program and provides public information assistance. Few technical functions are performed by the organizations involved.

3.6 Equipment Requirements

Agencies in the different areas had to purchase equipment for their I/M programs. In the state or city-operated systems, emissions analyzers were purchased to enforce the standards. (The private garages and the contractor purchased their own analyzers subject to approval by the administrating agencies.) In addition, portable analyzers were sometimes purchased for surveillance operations. The programs also acquired hoses and accessories, calibration gases, and different types of analytical equipment for equipment calibration. In some areas, automatic data processing and diagnostic equipment were purchased. A summary of the equipment in the different I/M programs is presented on Table 1.4. Pages E-10, F-15, and H-14 in the Appendix contain a list of the requirements for the analyzers in some of the fleets and private garages.

In all the programs, the HC and CO emissions are detected with infrared analyzers. However, there are considerable differences in the types of equipment. The simplest equipment are in Rhode Island and Nevada where portable analyzers are used to measure the emissions. The readings are usually shown on a meter. Cincinnati's equipment is almost as basic except that the standards are shown on the meters. New Jersey analyzers include pass/fail lights to indicate the failures. (The inspector must input the appropriate vehicle model year into the analyzer.) Oregon has stationary analyzers with digital readouts for HC, CO, CO_2, as well as engine rpm.

TABLE 1.4 EMISSION ANALYZERS AND OTHER TEST EQUIPMENT

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Emissions Analyzer	(New Analyzers)						
Type of Analyzer	Infra-red	Infra-red	Infra-red	Infra-red	Infra-red	Varies from garage to garage	Varies from garage to garage
Make/Model	Sun 3021	Sun 9101	Sun OEA-75	HTS	HTS		
Stock or Modified	Modified	Modified	Modified	Modified	Modified		
Display	Digital	Dial	Digital	Print-out	Print-out		
Measures							
HC, CO	X	X	X	X	X		
CO_2	X		X	X	X		
Automatic or Manual Data Recording	Manual (can be used with aux printout)	Manual	Manual	Auto	Auto		
Number On-Line	106	5	18	1 per lane (37 total)	1 per lane (45 total)		
Number of Spares	19	4	11 (1-2 spares per station)	0	0		
Cost	$4,656 (1980)	$1,400	$7,500	Not available	Not available	Not available	Range $900-$7000 Avg. $2,149
Tachometer							
Make/Model			Part of above analyzers		Part of analyzers		
Pick-Up			Clip to plug wire		Clipped to plug wire		
Display			Digital		Printout		
Cost							
Calibration Equipment (Cost)							
Hoses & Accessories	X ($10,000)		X	X	X	X	X
Gases	X ($75,000/yr)		X ($10,000/yr)	X	X	X ($3,000/yr)	X
Other Equipment			Analyzer	Horiba Analyzer PIR 2000 Beckman 6800 A.Q. Chromatograph (20,000)			Master analyzer at Challenge Station Horiba D400 - also used for challenge checks
Opacity Equipment (Cost)							
Type	Visual		Photographic film to determine visual levels	Visual (Smoke school)	Visual	Visual	Visual 0
Enforcement Equipment							
Portable Analyzer							
Type	Chrysler III						
Number	20						2
Total Cost	$40,000						Not Available
Other							Master Analyzer
Automatic Data Processing Equipment							
Type	Paper tape Printout						
Number	5						
What is Recorded?	Test data stds, test readings						
Cost							
Other Equipment	Sun 2001 for diagnostic work			Clayton Dynamometers	Plan to install Clayton Dyno's for loaded testing	Laboratory diagnostics Sun 2001 ($20,000) also used for Challenge checks	

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The CO_2 is monitored to check for excess exhaust dilution. Arizona and California use computer-operated analyzers that automatically determine the HC and CO levels after they have stabilized. As in Oregon, CO_2 is monitored to help the computer determine the validity of the test.

New Jersey is in the process of purchasing replacement analyzers which will perform additional functions such as determining the CO_2 levels. However, New Jersey is running into considerable delay in obtaining delivery of these analyzers, which were to be onstream by the end of 1979. Initially, the manufacturer was late in delivering a prototype. Meanwhile, the state-of-the-art of the analytical bench changed and the manufacturer requested an increase in the costs for the analyzers. This created a delay because the State requires that the order be awarded to the low bidder. However, these problems have been resolved and New Jersey expects to have the new analyzers onstream by mid-1980.

3.7 Land and Building Requirements

Most of the I/M programs have moderate land and building requirements. This is primarily because these areas either have existing safety test facilities or the tests are performed by private garages or a contractor. Oregon is an exception, but as will be discussed, it minimized its land and building costs by leasing most of its facilities and using mobile testing equipment. Some of the program areas have laboratories or challenge stations to handle complaints and aid in researching the programs. The challenge stations are an especially important entity in the private garage programs.

The implementation of I/M in New Jersey and Cincinnati did not require any additional land or buildings. These areas use the existing safety test facilities and office space. The New Jersey DEP leases laboratory space from another government agency, and Cincinnati does not maintain a laboratory. It should be noted that New Jersey and Cincinnati did have to provide electrical hook-ups and storage facilities for the emissions analyzers.

Since Arizona and California use a contractor-operated system, there were no requirements to these states for inspection facilities. However, Arizona did spend $99,000 to purchase land and $270,000 to construct office and laboratory facilities. In California, the Bureau of Auto Repair (which runs the program) uses the Air Resources Board's existing laboratory facilities and leases office space. This office has a garage which is sometimes used for research.

The private garage programs have similar land and building requirements, although costs vary considerably. Both Rhode Island and Nevada utilize existing office space for the I/M programs. However, Nevada spent $42,000 for a challenge station whereas Rhode Island performs its challenge checks in an old public-works garage that was converted for a cost of $750,000. It should be noted that this garage is mainly used for safety inspections of public vehicles and is rarely used for emission-related challenges.

Considerable creativity was demonstrated by the Oregon DEQ in providing serviceable yet inexpensive facilities for the inspections. Only one of the stations used in the Oregon program is a permanent facility. It was built on state land at a cost of $80,000 (1975) and includes two dynamometers for use if loaded-mode testing were to be established in the future. The other seven stations are located on leased sites in various parts of the city. Some of them in fact are mobile units (one in a former drive-in theatre) and others were selected because of the ease with which they could be converted to inspection facilities (one in a former RV service shop, another in a former service station). The administrative offices are in a downtown office building and are leased.

3.8 Summary of the Costs to Implement I/M

3.8.1 Operating Costs

The per car operating costs are shown on Figure 1.2. With the exception of Rhode Island, these costs are the incremental costs to the administrating agencies to implement I/M, and therefore do not reflect the costs for contractor or private garage personnel. Rhode Island's costs are for both the safety and the emissions inspections. The highest costs are in Oregon, but this would be expected since that area had no existing organization to enforce the program. California and Rhode Island are next highest. California's relatively large operating cost reflects its considerable personnel requirements (see Table 2.2.5), while Rhode Island's high costs are mainly due to the safety inspection. The incremental operating costs in the rest of the programs are considerably lower.

Although the operating costs vary considerably, there is some consistency between the programs. As shown on Figure 1.2, in all the programs except for Arizona, a sizable portion of the operating costs are for enforcement personnel. In addition, technical functions on the whole account for less of the incremental cost than do administrative functions. New Jersey is an exception here, but it already had a large administrative organization. However, there still are unique expenses such as the large expenditure in Oregon for leases. Greater detail on the breakdown of the operating costs is shown on Table 2.4.

3.8.2 Capital Costs

The per car capital costs to implement I/M are indicated on Figure 1.3. These are the costs to the administrating agencies and do not reflect the contractors' or private garage costs, or the costs for existing buildings

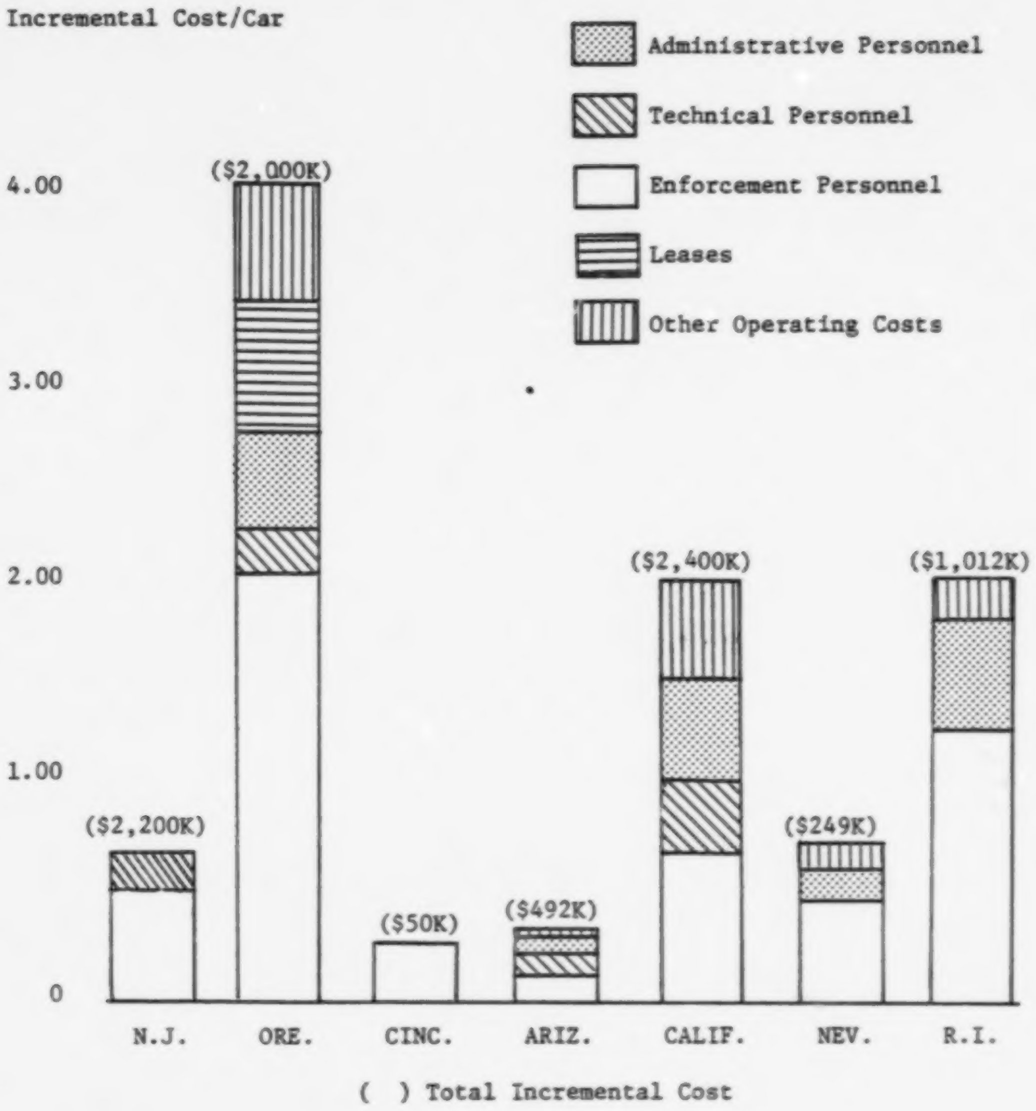

FIGURE 1.2 INCREMENTAL OPERATING COST

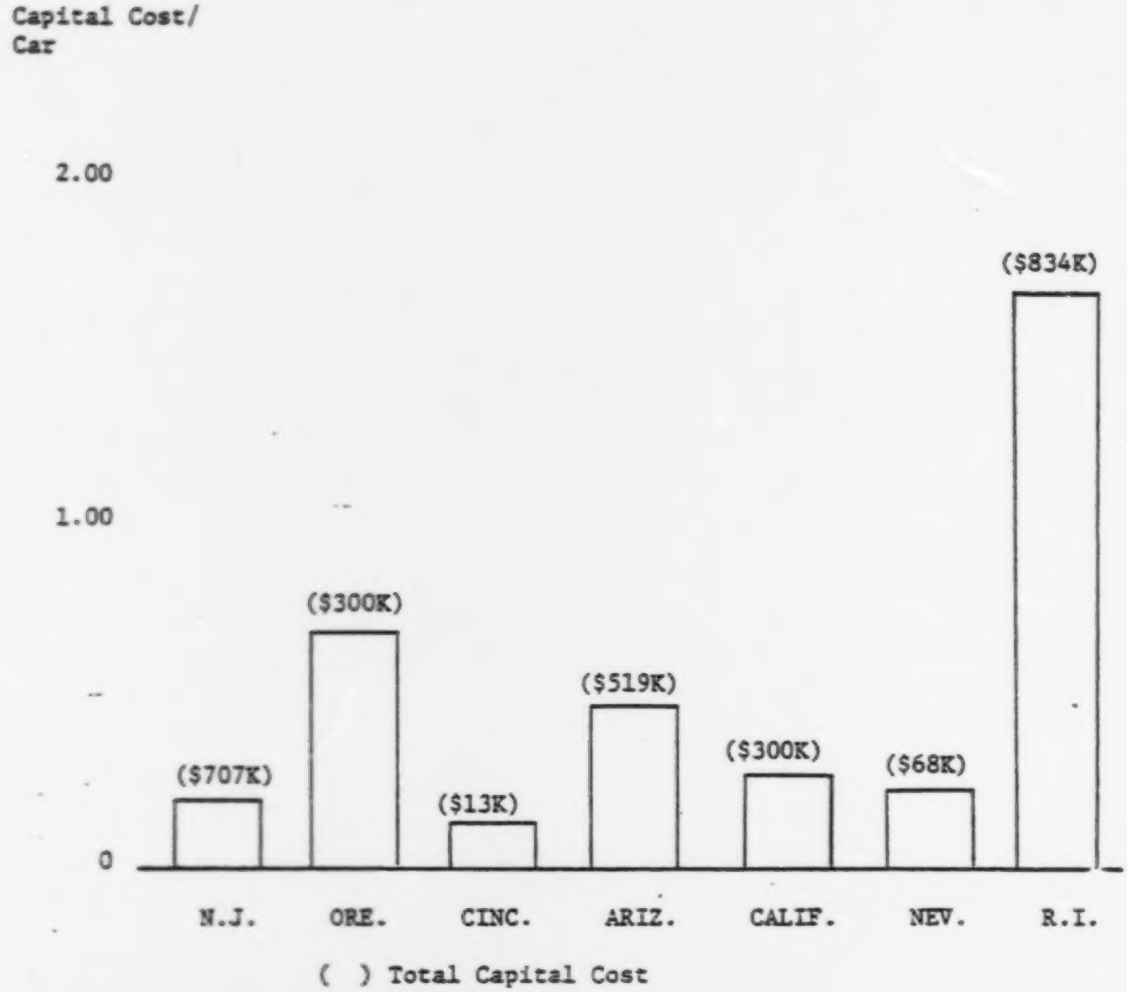

FIGURE 1.3 CAPITAL COSTS

and equipment. As shown, there are considerable differences among the programs. At $1.67 per car, Rhode Island appears to have the highest capital costs, but these costs are misleading since they are mainly for safety inspection facilities that were built at the time that I/M started. The capital cost directly for I/M in Rhode Island should be more like Nevada's cost of $0.20 per car. The per car capital costs were lowest in New Jersey and Cincinnati, where central safety inspection lanes already existed.

Among the programs, the only capital expenses that consistently showed up were for the analyzers in the state- and city-run programs. There was little consistency in the breakdown of the remaining capital costs. Approximately one-third of New Jersey's capital costs were for motor vehicles, while these costs were minimal in other areas. Likewise, California reported that most of its capital expenditures were for data processing software, while Arizona reported that most of its costs were for laboratory and office space. The inconsistency in the different capital expenditures derives from the fact that each program was specifically designed for the local conditions. Table 2.5 presents a breakdown of the capital costs in the different areas.

The creativity that the Oregon DEQ demonstrated when it set up the Oregon program is graphically illustrated by its capital costs. Since Oregon was the only program that had to set up and run the inspection program (i.e., there were no existing facilities), one might expect that its capital costs per car would be much greater than the rest of the programs. However, as Figure 1-3 shows this is not the case. This cost effectiveness is also reflected in Oregon's $5 fee with unlimited retests. Recent centralized contractor-run systems cost considerably more. It is possible that complying with the requirements of a contract (e.g. landscaping) can create capital-related charges which will outweigh the potential savings that a contractor may incur through its greater bargaining capacity for facilities and labor. However, it is difficult to investigate this possibility since contractors are reluctant to release information on their capital costs.

4.0 Selection of Cut Points

4.1 Initial Selection of Cut Points

Different approaches were used to select the cut points for the emissions tests. Some areas used an empirical approach which involved sampling vehicles and then determining the cut points that would result in the desired stringency level. Another approach that was used expands on the empirical approach. In this method, termed air quality cost benefit, the emission reductions and costs are evaluated for different cut points and the most cost effective standards are chosen. Cut points were also determined by conducting engineering evaluations of different vehicles and their control systems. In addition, some areas just used the cut points developed by other I/M prograns. Tables of cut points from the different areas appear in the Appendix, pages A-2 through A-14.

New Jersey and Arizona used an empirical approach to cut point selection. New Jersey sampled vehicles for a year in a voluntary inspection program. The test data were then grouped by model year (pre-68, 68-69, 70-74, 75+) and cumulative distributions of HC and CO emissions set up. From these distributions, the cut points for a 35 percent stringency factor were determined. New Jersey then set up three phases to arrive at this stringency: Phase I had a stringency factor of 10 percent, Phase II was 20 percent, and Phase III was the 35 percent stringency factor. New Jersey is currently in Phase II and is experiencing a failure rate of around 18 percent. (The Phase I failure rate was 12 percent.)

Arizona also sampled vehicles for a year in a mandatory inspection and voluntary maintenance program. It then set up cut points that would provide for a 20 percent stringency factor among groupings of model years and number of cylinders (pre-68, 68-71, 72-74, 75+; 4 or fewer cylinders, 5 or more cylinders). The actual failure rate turned out to be around 16 percent.

California initially selected its cut points to maximize the air quality cost-benefits. It sampled 1500 vehicles in a voluntary program and then evaluated the effect of different cut points on Federal Test Procedure (FTP) emissions, repair costs, and fuel economy. From this, California determined the cut points for the optimum cost effectiveness. However, the standards were opposed by the automobile manufacturers as being too stringent for all vehicles and therefore resulting in unacceptable (3 percent) errors of commission. An error of commission is when a vehicle fails the I/M test but passes the FTP test - the test it was designed to pass. As a result of the objections, California re-evaluated the cut points and relaxed them considerably.

Oregon arrived at its cut points by engineering analysis. Data were collected in a year-long voluntary program prior to the start of the official I/M program. Based on these data and a consideration of manufacturer recommendations concerning vehicle design performance and real-world maintenance, engineering evaluations for each model type were conducted. From this Oregon developed standards for each individual model. Pollutant criteria ranked CO reductions higher in priority than HC.

Nevada, Rhode Island, and Cincinnati used cut points that were developed in other I/M areas. Nevada used New Jersey's Phase III standards for its pre-1975 vehicles and its Phase II standards for 1975 and later vehicles. Rhode Island used New Jersey's Phase I standards for pre-1975 vehicles and Phase II standards for 1975 and later vehicles. Cincinnati used standards that were developed in a voluntary I/M program in Chicago.

4.2 Revising The Cut Points

As the programs evolve, in many cases it is necessary to adjust the cut points. Air quality considerations play an important role in this revision, thus standards have been changed to increase the emission reductions of single or multiple pollutants. Equity is another consideration in the adjustment of stringency. Cut points have been revised for a particular model or model year if test data indicates that there are abnormal failure rates for these vehicles. Also, like the initial selection of cut points, cut points have been revised to maximize the cost effectiveness of the programs.

Air quality was the main consideration when New Jersey changed from Phase I to its Phase II standards. The 10 percent stringency of Phase I was considered to be too low to have a noticeable effect on air quality. Currently the Department of Motor Vehicles objects to the implementation of Phase III standards without proof that there will be a corresponding improvement in air quality. New Jersey is considering the revision of some of the individual model year standards to equalize the failure rate. For instance, vehicles of model year 1970 are currently exhibiting a high failure rate. To lower this rate, officials may group 1970 vehicles with those of 1968 and 1969, instead of 1971-1974, as is done now.

In 1979 Arizona tightened its CO standards in order to improve the ambient CO levels. Using test data from 1978, Arizona increased the stringency to 30 percent while aiming for a 25 percent failure rate at the lanes. The 30 percent level was based on pre-program 1976 data where no maintenance was required, whereas the 25 percent level was based on 1978 data.

In January 1980 California started conducting hearings on revising the standards for the MVIP. Like the original cut point selection, the main consideration for the revisions was optimizing the cost effectiveness. However, to consider different emissions characteristics and diagnostic needs, separate standards were promulgated for the following post-1975 vehicles: 1) oxidation catalyst with air injection, 2) oxidation catalyst without air injection, and 3) three-way catalyst-equipped vehicles.

Because of the nature of the standards in Oregon, data reviews and subsequent revisions of the standards have been done on a per model type basis. Officials in the Oregon program feel that these individual standards are justified more for the earlier control technology than for current and future emission control systems. The differences between model types are less well defined now and thus the standards will probably become more uniform.

Nevada, Rhode Island, and Cincinnati do not intend to change their cut points in the near future.

5.0 Data Collection and Analysis

5.1 Methodology and Reports

In most cases, the collection of data is closely tied to the method of inspection. As tests become more automated, data collection becomes more sophisticated. The following are some of the items that are collected and processed in the different areas:

- Year and make of vehicle
- Vehicle identification number
- Engine size and/or style of car
- Mileage
- HC and CO readings
- Disconnected pollution devices (if tampering inspection included)
- Pollutant readings at speeds and loads other than idle
- Engine parameters (e.g. idle speed)

Both the handling and processing of data can be manual, semi-automatic, fully automatic, or combinations thereof. Manual processing is just that: data are recorded manually and any tabulation and analysis is also performed manually. In a semi-automatic system, the data are either recorded manually onto forms and then keypunched for data processing or they are manually entered into terminals at the lanes. Automatic systems feature equipment which record the data from tests directly onto magnetic tape. These data are then immediately available in machine-readable format for further analysis and/or report production. Tables 1.5 and 1.6 itemize of the features of each program.

New Jersey manually collects pass/fail data (for the initial test and any retests) along with the make and model of the vehicle. Reports issued monthly tabulate the pass/fail results. In addition, the garage investigators collect data describing the repairs at the reinspection stations. Other sources of data are the surveys that the New Jersey DEP conducts. The DEP independently samples 12,000 to 15,000 vehicles per year at the state lanes in order to obtain additional information such as idle HC and CO levels. This information is keypunched and then converted to tape. When analysis is required, the tape is converted to temporary disc storage which is then processed by a computer.

Oregon uses a more complex text procedure and collects more data at the lanes. For each vehicle tested, the following information is obtained: year and make of vehicle; engine size; 2500 rpm CO, HC, and CO_2 readings; before-2500 rpm and after-2500 rpm idle CO, HC, and CO_2; and any disconnected pollution control devices. These data are collected from the inspection sites and manually tabulated. Oregon has unlimited free retests and consequently has no special mechanism to keep track of reinspections; therefore, refailure rate data are based on a survey of the inspections. Maintenance data are also collected from occasional customer surveys (mail-ins). From these tabulations, a Monthly Activity Report is compiled which lists the number of vehicles tested per station; the percent passing the test; the percent failing for CO, HC, both CO and HC, equipment disconnects, or other causes (smoke, dilution, excessive idle rpm); the number of pre-catalyst vehicles; and the number of 1975 and newer vehicles. A survey of customer waiting times (sampled every 2 or 3 days) also appears monthly. Oregon DEQ officials feel that this sampling approach to data collection and analysis provides good statistical accuracy and is easy to implement in the absence of data processing equipment.

TABLE 1.5 DATA COLLECTION

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Data Collected (A = All inspected vehicles) (R = Roadside Checks) (S = Survey or Sample)							
Pass/Fail (Initial)	A	A	A	A	A	A	A
Pass/Fail (re-exam)	A		S	A	A		
Idle HC and CO							
Before Repair	S	A	A	A	A	A	R(biased for safety)
After Repair				A	A	A	
2500 RPM HC and CO							
Before Repair			A		A	A	
After Repair					A	A	
Loaded Mode HC and CO							
Before Repair				A			
After Repair				A			
Tampering Results			A		A	A	
Smoke Test	S		A		A		R
Engine Parameters			A	A	A	A	
V.I.D.		A		A	A	A	A & R
Make & Year of Vehicle	S	A	A	A	A	A	A & R
Engine Size/Family	S		A			A	
Repair Costs	S		S	S	A	A	
Odometer	S	A		A	A	A	A
Method of Collecting Data	Lane data - manual; survey data semi-automatic		Collected Manually	Test data automatic, Vehicle Info. semi-automatic	Test data automatic, Other data manual & semi-auto.	Manual & semi-automatic	Collected Manually
Method of Storing Data	Cards → Tape Tape → Disk		Hard-copy	Tape	Tape	Forms → Tape	Currently hard-copy developing programming

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TABLE 1.6 DATA ANALYSIS

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Analysis and Reports							
(A = All inspected vehicles) (R = Roadside checks) (S = Survey or Sample)							
No. of Inspections	A	A	A	A	A		
Failure Rate							
Overall	A	A	A	A	A	A	
By Inspection Sta.	A	A	A	A	A		R
By Pollutant	S		A		A		R
By Model Year	S		A	A	A		
By Make & Model Year	S		S	A			
Re-Exam Failure Rates							
Overall	A		S	A	A		
By Inspection Sta.	A			A	A		
By Pollutant					A		
By Model Year				A	A		
By Make & Model Year				A			
Average Idle HC and CO							
Before Repair							
Overall	S			A	A	A	R
By Model Year	S			A	A	A	R
After Repair							
Overall				A	A	A	
By Model Year				A	A	A	
Average 2500 RPM HC & CO							
Before Repair							
Overall					A	A	
By Model Year					A	A	
After Repair							
Overall					A	A	
By Model Year					A	A	
Average Loaded HC & CO							
Before Repair							
Overall				A			
By Model Year				A			
After Repair							
Overall				A			
By Model Year				A			
Repair Costs	S		S	S	A	S	
Other Analysis	Data base maintained on survey data and accessed as needed. Waiting time survey		Type of repair, waiting time	Additional analysis (e.g., CO failure rate data for '79 GM vehicles)	Cost effectiveness using actual FTP results for certain cut points. Repair data by Mech & repair facility.	Data base maintained on test data and accessed as needed	

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In Arizona, emission data is automatically recorded on magnetic tape as it is measured (and printed out for the customer). Hamilton Test Systems provides this tape each month to the State of Arizona, which then converts it for their automatic data processing system and make a copy for storage. A report is issued monthly which tabulates, per test station, the number of tests, financial information, the number of retests, and emission test data broken down for vehicles of each model year. This consists of CO and HC data at idle, in the low cruise mode, and in the high cruise mode. In addition to this tabulation, data on repair costs are collected manually from waiver surveillance.

California has the most extensive data collection and reporting system of all the current I/M programs. As in Arizona, a magnetic tape automatically records the results of each emission test. Every two weeks, Hamilton Test Systems furnishes these tapes to the Bureau of Automotive Repair in Sacramento. The Bureau processes the tapes and tabulates the data and then sends it to the Air Resources Board. The Board also compiles a variety of reports from the data. One is a tabulation of failure rates (for excessive emissions, failure of device, smoke, or excessive rpm) by vehicle category (classed as to model year, number of cylinders, and emission control system). Another lists the number of vehicles in each category that had malfunctioning emission control devices and indicates which device(s) were responsible for the failure. Repair data is also tabulated semi-automatically on a report which lists all repair facilities in a given area, the number of repairs made at each facility, the percent passing retest, and the average repair cost. In addition, an Activity Report is prepared manually which lists the number of fleet applications and inspections, customer inquiries and complaints, data about mechanic seminars and qualification certificates, waivers, and quality assurance activities.

The California Air Resources Board also prepares and releases reports relating to the operation of the program. Board personnel conduct surveillance testing independently of the inspection program and compile cost/effectiveness analyses at various selected idle HC/CO cut points. These analyses include estimates of fuel economy improvements resulting from the maintenance, and the average repair cost necessitated by the maintenance.

In Nevada the vehicle and emission data are recorded on the inspection forms and then entered by computer terminal into the data processing system in Carson City. Periodic computer reports are prepared, listing the before and after maintenance CO and HC emissions at idle and 2250 rpm, the average emission reduction for each pollutant, the average cost of inspection, and the average cost of maintenance for vehicles of various model year classes.

Data collection in Rhode Island has been a problem because garages sometimes simply make adjustments and do not record failures. In 1979, no pass/fail data were collected from the garages. New forms have been designed for 1980 to try and correct this situation. Currently, the garage receipts are collected and processed manually. State inspectors also conduct roadside checks of vehicles for safety and emissions compliance. (Usually, the checks are biased towards candidates for the safety inspection.) A total of 1,000 vehicles were checked for emissions in 1978, 5,000 in 1979. On the other hand, in 1979, the state conducted 26,000 roadside checks for safety. Before-repair idle HC and CO data are collected during these roadside inspections and averages of this data for classes of model years is summarized in the Vehicle Safety and Emission Inspection Program annual reports.

Cincinnati manually collects pass/fail data on the initial inspections and every month these data are tabulated. Although the inspection forms indicate idle HC and CO levels as well as vehicle data, these data are not analyzed.

5.2 Computer Hardware and Software Requirements

Except for purchasing data-entry terminals and keypunch equipment, hardware requirements for I/M have been minimal. And because most of the programs were absorbed into existing agencies, there are few details on specific software requirements. New Jersey estimates that it developed the software necessary to handle the data produced by the independent DEP survey for about $20,000, and its annual computer costs are estimated to be about $5,000. In addition, some data analysis in New Jersey is performed by outside organizations; for instance, Rutgers University has performed a repair cost analysis. Oregon does not use computerized data processing for inspection/maintenance data, although the DEQ does have the capability. Arizona uses existing hardware and their annual data processing costs are estimated to be about $35,000. Nevada also uses existing hardware at the Department of Motor Vehicles, but added two terminals for inputting inspection data. Currently Rhode Island manually tabulates its data, but it is developing software with the aid of a $54,000 EPA grant.

Of all the programs, California performs the most extensive data processing and, accordingly, it incurs the greatest costs. California developed its software for approximately $260,000 and its annual computer charges are around $25,000. In addition, the I/M portion of California's data processing system requires the full-time services of an engineer and a data analyst. Because the contractor takes care of most of the data collection, there are minimal hardware requirements for the state. The Bureau of Auto Repair does lease terminals to enter and extract repair data. California has good documentation of its data processing hardware and software; therefore, additional details are presented in the Appendix, page C-2. The Appendix also contains copies of data forms and reports from all of the programs.

6.0 Quality Assurance

Different types of quality assurance (Q.A.) tasks help to insure that a program is operating effectively and that motorists receive fair treatment. In every program, analyzers are regularly checked with calibration gas. In addition, on some of the analyzers the span and zero are periodically set. Other Q.A. tasks include independent sampling of vehicles, roadside checks, and surveillance of the inspection stations. This last task is especially important if the inspections are not performed by the administrating agency. In the private garage programs, challenge stations are useful in verifying the performance of a particular garage. Also, the performance of the overall program or of the individual inspection stations and repair facilities can be determined by analyzing test data. The different Q.A. tasks are summarized on Table 1.7.

Each month, state officials in New Jersey calibrate the analyzers at the state inspection lanes. In addition, New Jersey officials visit each certified reinspection station at least once every 2 months in order to verify the accuracy of the analyzers and to inspect records. The officials look at both the recorded emission levels and the charges to the customer in order to determine if proper repairs are being performed. In some cases the officials will reinspect vehicles with unusual or questionable repairs. New Jersey also independently surveys about 12,000 vehicles to gather additional data about the program. Some of these data can be used for Q.A. analysis. To aid in the quality of inspections and repairs, New Jersey also provides garages with specifications for portable analyzers as well as a list of analyzers which comply with these requirements.

New Jersey feels that, on the whole, the state lanes adequately inspect the vehicles. However, areas of concern do exist. Analysis of data from the state-operated lanes has pointed out large fluctuations in the failure

TABLE 1.7 QUALITY ASSURANCE PROGRAMS

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA		CALIFORNIA		NEVADA	RHODE ISLAND
				Contractor	Fleet	Contractor	Fleet		
Analyzer Calibration									
Frequency	1/mo min - 1.5/mo average	1/mo.	5/day	Weekly	Mfr's Recomm.	Weekly	Weekly	No requirements. Will get analyzer calibrated by Mfr. if red tagged	Weekly
Responsibility	State officials (DEP)	Service Contract with Manuf. ($32 per analyzer per month)	Lead inspector	Contractor	Fleets	Contractor	Fleets		Garage Personnel
Span-gas-checked for Traceability	Yes	No	Yes	Yes	Yes	Yes	Yes		If offsets are found at the garages
Documented Procedures	Yes	No	Yes	No	No	Yes	Yes		No
Set Span and Zero of Analyzer	Twice/day, new analyzers will be set automatically	Hourly	As needed, at least 5/day	Auto	Per Mfr's recomm.	Auto		Before each test	Garages are supposed to set before each test.
Station Inspection	(Reinspection Sta.)		(Fleets)						
Frequency	1/2 mo.		Monthly	2/mo.	Every 90 days	2/mo.	Every 60 days	Monthly	Monthly
Announced or Unannounced	Unannounced		Both	Unannounced	Unannounced	Unannounced	Unannounced	Unannounced	Unannounced
Responsibility	State officials (DMV) 1/100 sta.		State Official (DEQ) 1/50 sta.	State Official	State Official 1/150 sta.	State Officials 1/10 lanes	State Officials 1/40 stations	DMV Officers 1/75 sta.	DOT Officials 1/30 sta.
Function									
Check Analyzer	X		X	X	X	X	X	X	Calibration Demos. X (Calibration)
Check Records	X (Calibration)		X (Calibration)		X (Calib.)	X	X	X	X (calib.)
Collect Forms	X		X		X		X	X	
Others				X (House-keeping)		X (Data recording equipment) system leak check	X Repair procedures & diagnostic ability	Look for repair books	X
Std. Inspection Procedures	No		No		No	Yes			No
Use of Challenge Station or Laboratory	Used for maintenance & repair of analyzers (Major repairs are performed by Mfr.)		Master analyzer used for gas checks	Use for quality control of calibration gases.				Used to check complaint & all waiver vehicles Approx. 20 complaints/month	Used to check accuracy of inspection. Not well publicized. 20 vehicles checked in 1979 (6 passed)
Data Analysis	Failure rates at the stations are analyzed		Failure rate per station	Mainly used to verify charges		Repair data used to check performance of garages and/or mechanics			
Spot and Roadside Checks	Look at reinspection records & check vehicles with unusual repairs	No	No	Waiver surveillance. About 50% of waiver cases are critically reviewed - mechanics get notification at times		Yes - Selected certified vehicles are reinspected at fleets		Yes - Officials submit tampered cars for inspections	Yes - Safety checks with some emissions checks are made. Non-complying vehicles must be repaired or possibility of fine.
Other Q.A. Tasks	Approve analyzers for repair, independent sampling of vehicles.	Comparison checks made on analyzers	Unannounced monthly calibration run. Cross reference testing of analyzers from different sta.	Certify analyzers				Investigate garages as a result of complaints	Investigate garages as a result of Challenge sta. visits.

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rate from station to station. Also data from New Jersey's independent survey of vehicles has shown that the overall failure rate at the state lanes is lower than the standards would indicate. New Jersey officials attribute these discrepancies to irregularities in the skill of the inspectors, to differing lane lay-outs, and to demographics in the different areas.

New Jersey feels that the private garage-operated reinspection program is effective, but again there are areas of concern. Each year, New Jersey's garage investigations result in the suspension of licenses for approximately 60 reinspection stations. In 1979, garages were suspended as a result of the following violations:

45 for certifying vehicles without making repairs (both safety and emissions)
7 for certifying vehicles with analyzer out-of-order
7 for unsatisfactory inspection personnel
2 for failing to properly secure stickers

In addition, each month, New Jersey officials red-tag (put out of service) approximately 18 percent of the analyzers at the reinspection stations.

Arizona performs several types of quality assurance tasks. Test data are analyzed to verify the contractor's charges to the state. Officials also survey the stations and verify the accuracy of the analyzers used at the inspection lanes at least once every two weeks. The contractor calibrates the equipment on a weekly basis. Officials verify analyzer accuracy at the fleet inspection stations at least once every 90 days. In addition, in Arizona a repair facility may voluntarily register an emission analyzer with the state. These registered analyzers are checked for accuracy initially upon registration and at least once each 90 days thereafter.

Arizona reports that there are few quality assurance problems with the contractor. However, there have been a few problems with the fleet stations. As of the end of 1979, two fleets have had their licenses suspended--one for 30 days and the other for 60 days. The suspensions were made because these fleets were either conducting inspections with non-licensed inspectors or not inspecting vehicles at all. The latter case was determined by noticing that the filter in the analyzer was not dirty and had not recently been changed.

Another concern in Arizona is that waivers have been granted for about 30 percent of the failed vehicles. Therefore in 1979, Arizona started performing an additional Q.A. task aimed at reducing the number of vehicles which get waivers when proper repairs would have put them into compliance. In this program (termed Waiver Surveillance), a state official critically reviews each waiver case. The officials might look at the records of reported repairs and examine the vehicles to determine if the repairs were correctly performed. In some cases the repair facility is actually contacted in the presence of the customer. This program has been effective in identifying potential candidates for the state's mechanic training programs and getting vehicles repaired (to compliance) which normally would have been waived without compliance. Approximately 50 percent of the waiver cases are reviewed in this manner, the rest receiving almost automatic approval by the contractor. At times the contractor will withhold a waiver if it is obvious (from the emission results) that repairs were not performed. To consolidate the system for granting waivers with the Waiver Surveillance program, Arizona expects to change the contract to eliminate the automatic granting of waivers.

Like Arizona, California also performs surveillance of the contractor and fleet testing facilities. The contractor stations are inspected every 2 weeks for analyzer and inspection accuracy as well as for proper housekeeping. In addition, other equipment such as the report printers, data entry terminals, and ambient carbon monoxide monitors are checked for calibration and correct system operation. A leak check of the entire sampling system is also conducted. Fleets are inspected every two months for analyzer accuracy and proper completion of forms. In addition, the fleets may be asked to demonstrate certain repair and diagnostic procedures. California also submits selected inspected vehicles for reinspection at the fleet stations. The contractor and the fleets are required to calibrate the analyzers weekly.

As of October 1979, the quality control checks performed by California have shown the emissions inspections by the contractor to be over 99 percent accurate. The contractor's performance on underhood inspections has also been encouraging. This portion of the program was not clearly spelled out in the contract and was the cause of some complaints at the start of the program. Improvements in the skills of the inspectors have resulted in an increase in the underhood inspection failure rate from approximately 16 percent, experienced during the first five weeks of the program, to 31 percent, found during the last twelve weeks of the program. (MVIP Annual Report, October 1979).

California suspends approximately two fleets each month as a result of surveillance activities. As of December 1979, California had conducted 2,201 fleet investigations which resulted in the following violations:

Required tools missing or required equipment out of order	396
No qualified MVPC mechanic employed	85
Records maintained improperly	54
Fleet licensing criteria	29
Other violations (i.e., failure to follow inspection or repair procedures, etc.)	134
Total number of violations found in 798 fleet stations over 2,201 inspections	698

California also carefully monitors the performance of the qualified mechanics by keeping track of pass, fail, and waiver rates for vehicles repaired by each mechanic and each repair facility. As mentioned earlier, all paid repairs are required to be performed by one of these mechanics. The retest failure rate of vehicles repaired by each mechanic is recorded, and a "conformance score" is calculated according to how accurately the mechanic followed the diagnostic instructions on the computerized vehicle inspection report for each vehicle. Since this information is useful to the owner of a failed vehicle who is seeking a reliable mechanic, California makes available at each test center a list of participating repair stations located near that test center. This list shows the number of vehicles repaired by the repair facility, the percent of repaired vehicles passing their first retest, the "conformance score" of the mechanic at the facility, and the average repair cost for all the I/M repairs performed at the particular garage. This list permits motorists to make informed decisions about where to get their vehicles repaired and encourages competition in the service industry (MVIP Annual Report, October 1979). Analysis of retest data has shown that the qualified mechanics perform adequate repairs and that only 10 percent of the initially failed vehicles obtain waivers.

Nevada also devotes considerable time to quality assurance. Officials visit each inspection station at least once per month in order to verify the accuracy of the emission analyzer and to collect records. Some of the records are then examined in order to determine the reasonableness of the charges and repairs. During the visits, the officials check to see that the station has current service manuals with correct tune-up specifications. Nevada also performs spot checks on some of the inspection stations. An unidentified person will have an inspection performed on an incorrectly operating car, such as a vehicle with a spark plug wire removed. Garages will usually be investigated in this manner as a result of complaints or challenge station checks, although Nevada tries to spotcheck each garage at least twice a year. Additionally, Nevada requires that all waiver cases first be checked by an official at the challenge station before approval. Like Arizona's waiver surveillance program, this requirement helps to identify garages that need to be investigated.

As of the end of 1979, Nevada had revoked the licenses of 6 stations because of failure to perform the inspections correctly. In addition, 15 to 20 percent of the analyzers were red-tagged each month. When an analyzer is red-tagged, the state confiscates the forms and the analyzer must be repaired (or calibrated) before the station may resume inspections. (To overcome the possibility of not being able to conduct inspections, many garages have more than one analyzer). On the whole, Nevada officials feel that the garages are doing a good job.

Oregon has always been concerned about good quality assurance. For the first few years of the program, analyzers were calibrated hourly and the stations were visited frequently by DEQ inspectors. Now the lead inspector calibrates the analyzers hourly during the morning when they are warming up and then every three hours after that, or more frequently if they seem to require it (a minumum of five times per day). It was reported though, that the analyzers hold calibration very well. Each station has at least one extra analyzer if difficulty arises. All stations are visited at least once a week by a DEQ engineer/supervisor and the 50 fleet inspection stations are visited at least once a month. In addition, an unannounced calibration visit is made to the stations monthly, featuring cross reference testing of analyzers from different stations. As a result of these precautions, Oregon has had very few quality assurance problems at the lanes. However, Oregon officials are still concerned over the quality of the repairs and feel that the program may benefit from closer control of the retests. (Oregon has unlimited retests.)

Rhode Island officials make monthly visits to the licensed garages and have the station personnel demonstrate a calibration of the analyzers. While they are at the garages, they check the calibration records and collect the emission test reporting forms. (The garages must calibrate the analyzers weekly.) In addition, some state vehicles are equipped with emission analyzers which can be used in the roadside safety checks. In 1979 emissions were checked in approximately 5,000 of the 26,000 roadside checks.

In 1979 Rhode Island suspended the licenses of 13 garages for violating the inspection requirements. However, all of these suspensions were for improper safety inspections and not specifically emission inspections. Officials in Rhode Island's inspection department report few emission related problems, although there is little accurate data on the emission failure rate. However in the monthly garage inspections officials note that 14 percent of the analyzers are initially out of calibration. After the garages demonstrate a calibration about three percent of the analyzers are still out of specification (plus or minus 5 percent).

In Cincinnati, the analyzers are calibrated every month as part of a service agreement with the manufacturer. Cincinnati performs few additional quality assurance tasks and has experienced problems with large fluctuations in failure rates. However, these problems are minor in comparison with the enforcement problems in Cincinnati.

In addition to the preceding tasks, most of the programs try to assure the quality of their calibration gases. This is usually accomplished by purchasing gases of a known concentration and then using these gases to name or cross-reference the gases used in the field. Some programs also use master analyzers to verify the content of the gases. One state (Arizona) plans to use a gas chromatograph to check its calibration gases.

The equipment used to assure the quality of the calibration gas is summarized on Table 1.4.

There are several areas of concern regarding quality assurance in the different program areas. Accurate data on failure rates, and accordingly, on the effectiveness of the program, has been sparse in the private garage programs. The high percentage (up to 20%) of analyzers that are found to be out of order in the private garages and fleets indicates that analyzer accuracy is of special concern in the decentralized programs (including fleets). Analyzer calibration and inspector skills are also potential problems in the centralized programs. Data analysis has shown that in some centralized programs there are often large fluctuations in the failure rate from station to station. Concerns have also been expressed over the adequacy of the repairs made on the failed vehicles. However, the administrating agencies are addressing these issues and continue to respond to the needs of the programs by adding or changing the quality assurance efforts. Arizona's waiver surveillance program is one such example.

7.0 TRAINING PROGRAMS

The successful implementation of an I/M program requires that certain people undergo training. Consequently, the administrating agencies have developed programs to train inspectors, station investigators, and mechanics. These programs are summarized on Table 1.8.

7.1 Inspector Training

In most of the I/M programs, training is conducted for the inspectors. The training mainly addresses the background of the I/M program, the operation and maintenance of the emission analyzers, and the proper completion of forms. Where tampering inspections are made, training is sometimes conducted on the locations and functions of different emission control devices as well as on the different types of hood releases. (The hoods need to be opened for a tampering inspection.) In some cases, training also addresses the causes of different types of emission failures as well as specific diagnostic procedures. However, officials in many of the program areas feel that the inspectors could use additional training.

Of all the inspector training programs, the one conducted by Oregon is the most extensive. It is a formal, one week-long training program for state inspectors which uses slides accompanied by a tape recording and a procedures manual. Topics covered include: the background of the program, air pollution causes and controls, how to release hoods on different vehicles, and clerical skills and handwriting. Between 20 and 50 people are trained per year in the program, which has been accredited by Clackamas Community College. In addition, Oregon offers a 2½-day training program for fleet inspectors. This program is similar to the state inspector training program except that there is less emphasis on the background of the program and on the personnel aspects. Details on these and other programs are shown on Tables 2.9.2 through 2.9.5.

TABLE 1.8 TRAINING PROGRAMS

TYPE OF TRAINING	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Mechanic Training							
Train Instructors	X (in past)	X (in past)	X	X (in past)	X		
Conduct Seminars				X	X		
On-Site Instruction				X			
Sponsor Vocational Training	X (in past)		X		X		
License/Certify Mechanics					X		
Number (%) Certified by NIASE (Entire state)*	2,982 (16%)	-	1,136 (20%)	964 (20%)	7,176 (15%)	239 (20%)	312 (13%)
% of Mechanics Trained							
Inspector Training	At beginning of I/M, N.J held several 1 day sessions on use and maintenance of analyzers	Sun Electric Corp. trained personnel in operation of analyzer	One week training program with tape and slides	Contractor trains personnel. Fleet inspectors trained by state. 7 hr course	Contractor trains personnel. Fleets-Class A mech. plus 2.5 hr inspector train.	No formal training; however test req'd & vo-tech train. to be cert.	15 hr course 4 hrs on emissions analyzers
Supervisor Training			None (except for continual)		None (except for continual)		20 Hr. in-house program
Training for Station Inspectors or Quality Auditors	DEP personnel trained in test procedures and the calib. & oper. of the analyzers. Investigators trained in calibration procedures				Trained for approx. 1 month by working with other inspectors		20 Hr. in-house program - mostly safety oriented

*Source; NIASE

7.2 Training for Station Investigators

In most of the programs, station investigators already have an automotive and enforcement background, or they are trained by working with experienced investigators. However, in some of the programs training is conducted for the investigators. When New Jersey implemented its private garage reinspection program, about 45 former safety inspectors were trained in calibration procedures, rules and regulations, and investigation techniques. In Rhode Island garage investigators, along with other personnel in the administrating agency's inspection department (RIDOT), are required to take a training program. Although the major emphasis in this training is on safety, the training also addresses analyzer calibration procedures and problems as well as the causes of high HC and CO emissions. Details on these training programs are shown on Tables 2.9.1 and 2.9.5. In addition to these programs, many of the administrating agencies offer continual education programs on technical subjects and management techniques.

7.3 Mechanic Training

Emission-related work is new to the service industry, and consequently it is important that the mechanics undergo some training. Currently, Oregon, Arizona, and California sponsor some form of mechanic training. In the past, New Jersey trained instructors in vocational schools to use an educational package developed by Colorado State University. Although Nevada does not sponsor mechanic training programs, a person must pass a written and hands-on test as well as show proof of completion of an automobile mechanic's training course in order to become a certified inspector. Nevada also requires that the certified garages own an oscilloscope in order to be able to diagnose some of the more difficult repairs.

Arizona has approached mechanic training in several ways. Like New Jersey, in the past Arizona conducted workshops to train vocational education instructors. Currently, Arizona conducts training seminars for both mechanics and the general public. In addition, Arizona conducts a special training program aimed at correcting the high number of carburetor maladjustments made by tune-up mechanics. Performed at the repair facilities, this program demonstrates the propane enrichment technique for carburetor adjustments. The waiver surveillance program discussed earlier serves as a tool to identify candidates for this program. Arizona officials also make about four contacts a day with individuals and repair facilities concerning specific maintenance problems or procedures. Details on Arizona's mechanic training programs are shown on Table 2.9.3.

The Oregon DEQ sponsors a mechanic training course which uses the Colorado State University curriculum. The DEQ also interfaces with vocational schools and community colleges in the area. As a result of these activities, the DEQ has an excellent rapport with schools as far away as in eastern Oregon. No formal licensing is required of mechanics. This is a problem because it diminishes their incentive to attend the courses. Also, there is sometimes a problem getting the mechanics who particularly need the training to attend the courses. (Other areas have expressed similar concerns over the lack of licensing.) Details on Oregon's mechanic training programs are shown on Table 2.9.2. There are no refresher requirements but subsequent courses are available.

Nearly a year before the start of the I/M program, California conducted seminars to familiarize automotive mechanics with the requirements of the program. This was done to ensure that there would be a sufficient number of qualified persons available to perform repairs on the failed vehicles. The seminars were conducted throughout southern California in each of the six counties. Topics covered in the seminars included emission control system diagnostic techniques and repair procedures and low emission tune-up procedures. A written examination on the topics covered was given to mechanics who attended the seminar, and only mechanics who passed the test received Certificates of Qualification (which are valid for three years).

Since the start of the I/M program, California has continued to conduct the qualification seminars. Mechanics who fail the examination may obtain additional training at various educational institutions. An official training package approved by the State Department of Education and comprised of visual aids, narrative, and demonstrations is available at 23 educational institutions in southern California, including community colleges, adult education programs, private schools, and regional occupations programs. (MVIP annual report, October 1979.)

One area of confusion to the public is that California has two types of licenses: Qualified and Qualified MVPC. A mechanic is "Qualified" if he or she has passed the exam and received a Certificate of Qualification. The test requirements for a Qualified MVPC are similar, but these mechanics also receive additional instruction in the background of the program. All paid repairs must be done by either of these classes of mechanics, but waivers will be granted only if repairs are performed by a Qualified MVPC mechanic. California is considering simplifying the procedure and only licensing one class of mechanic. Additional details on California's mechanic training program are shown on Table 2.9.4.

Several of the program areas promote voluntary mechanic certification through the National Institute for Automotive Service Excellence (NIASE). NIASE is a non-profit organization that administers tests to certify mechanics and has been endorsed by most of the automobile manufacturers. Although NIASE certification is not primarily directed at I/M-related repairs, its engine tune-up examinations do address the diagnosis of emission control system problems. A possible disadvantage of NIASE is that there is no hands-on test and therefore it does not demonstrate the dexterity of the mechanic.

Also, oil and automobile companies have sponsored their own in-house training programs. Some of the oil company programs have been particularly praised by the I/M officials. In addition to the service industry, community colleges and vocational schools have established their own training programs. However, there are doubts that there will be enough adequately trained mechanics to handle the repairs associated with the more sophisticated emission control systems.

8.0 PUBLIC INFORMATION

8.1 Description of Programs

The success of an I/M program greatly depends upon the cooperation of the public. Consequently, administrating agencies have devoted fairly substantial efforts to public information, especially in the period before and immediately after the initiation of the programs. These efforts have varied from distributing pamphlets about the emission tests to prime time television public service announcements. Introductory periods with voluntary maintenance have been especially useful in informing the public about the emission test. Also, change of ownership programs have provided a means of acquainting the public with I/M and have helped to familiarize the administrating agencies with potential sources of complaints. Diagnostic assistance to motorists that continue to fail the test is another form of public information that has been used. All of the programs provide question and answer assistance over the telephone. See Table 1.9 for summary of the Public Information programs.

New Jersey has used several different approaches to public information. Although the 1½-year voluntary phase that preceded the mandatory program was mainly intended for data collection, it also helped to educate the public about emission inspections. At the start of the program, the New Jersey inspection stations made available a list of repair facilities with approved analyzers. The stations currently distribute pamphlets and brochures (developed by EPA) which describe the need for and key points of the emission inspection. New Jersey offers telephone assistance to answer motorists' questions and refer them to the laboratory, which is open to the public on appointment. The two technicians at the laboratory are instructed to offer diagnostic assistance to motorists whose vehicles repeatedly fail the emission test. The service occupies as much as 15 hours weekly per technician. In addition, New Jersey makes use of press releases and public van demonstrations to keep up public awareness of the program.

TABLE 1.9 PUBLIC INFORMATION

TYPE OF PROGRAM	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Preliminary/ Voluntary Test Programs	1-1/2 year program Mandatory inspection Voluntary Maintenance		1 year voluntary program	1 year mand. inspection/ voluntary maintenance	Phase I voluntary program. 50,000 vehicles tested	Voluntary testing sponsored by Lung Assoc. and DMV	1 year mand. inspection/ voluntary maintenance
Pamphlets	Developed by EPA and state	Distribute EPA handbook at first. Currently distribute their own pamphlet	Developed by state & EPA. Reminder with registration forms.	Developed by state, EPA, & contractor	Distribute pamphlet describing program & repair facil. Do not encourage do it yourself repair	Notices dev't by DMV. Distribute EPA pamphlet	Lung Association developed pamphlets with EPA grant.
Use of Challenge Station or Laboratory	Laboratory is open by appointment			Approx. 10 veh/day have diagnostics performed at laboratory	Challenges made at lanes	Complaints, diagnosis	Customer may have vehicle checked for free after garage inspection. (rarely used)
Telephone Assistance (Consumer Hot-Lines)	DEP Personnel Answer questions and refer people to the laboratory	City and County personnel involved will answer questions	Public may call DEQ. No formal hot line	Contractor maintains toll free # (watts) Customers can call state.	Contractor maintains toll free # (watts). Customers can also call B.A.R.	DMV number is well publicized	May call DOT. No formal DOT hot line Lung Assoc. has hot line (rarely used)
Radio & Television Ads or Public Service Announcements				Contractor placed prime time ads (advise to avoid end of month)	Contractor placed prime time ads at beginning of program	DMV & county officials appear on talk shows	Chief appeared on question & answer shows
Other Programs	Press releases, Public van demonstrations. Provide customer with list of repair facilities	Press releases to improve relations	Press coverage, DEQ bulletins, bumper stickers	Press releases, opinion surveys	Press releases, opinion surveys	Set-up booth at county fair	Attempts to improve press relations. Attitidinal survey sponsored by EPA Region 1
Manpower Requirements	15 hours/week for diagnostic technician	None	Less than 1 person	1 person - fulltime for diagnostic technician	ARB - 1 person, BAR- 9 people to handle complaints	1 person full-time in labor. (not all P.I. work)	1 person in DEM coordinates public education programs. Other responsibilit

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Oregon used its voluntary program extensively for public relations. Certificates and bumper stickers were given to motorists whose cars passed the emission test. Free promotional press coverage and news spots were used to publicize the inspection program. Currently, Oregon distributes pamphlets (some of which were developed by the Oregon DEQ plus those published by the EPA) to motorists at the inspection lanes which discuss the emission test, what to do when a vehicle fails the test, and how the inspection can help to improve fuel economy. (The pamphlets cost about 3 to 5 cents each to publish and distribute.) Oregon is considering placing information displays in the inspection stations which would make available a wide range of pamphlets and brochures. The Oregon Department of Motor Vehicles inserts a notice about the inspection program with each reminder sent to the public about expiring license plates. The DEQ offers telephone assistance (part of the time commitment for one of the staff engineers) to motorists with problems. There is also a 24 hour telephone service with a tape-recorded message giving inspection station locations and hours of operation. In addition the Oregon DEQ publishes an Information Bulletin, a fact sheet for the service industry, which has over 1400 recipients.

The majority of the public relations work in Arizona has been performed by the contractor. Arizona's I/M program was implemented as a five year program with maintenance being voluntary in the first year. This helped to provide publicity about the program. However, the program was not free and many motorists objected to the mandatory inspection. Later, when a proposition threatened to repeal the emission test, the contractor spent approximately $200,000 on public relations. The campaign included several television spots, in addition to radio and newspaper announcements. The contractor also garnered the support of local labor and health associations. State wide, the proposition was defeated by a six percent margin. Currently, the contractor and the state split the public relations cost roughly 60 percent and 40 percent, respectively. The contractor places prime time advertisements advising the public to avoid waiting to the end of a month for their inspection. The contractor maintains a toll-free WATS line to handle questions and complaints, and customers can also call the state. The contractor issues press releases and opinion surveys about the program. To handle problems, the state operates a laboratory which performs diagnostic examinations on approximately 10 vehicles per day. This requires the full-time service of one diagnostic technician. The contractor also dispenses pamphlets and brochures developed by the state, the EPA, and themselves about the I/M program.

The voluntary testing program sponsored by the Nevada Lung Association and the Nevada Department of Motor Vehicles functions as a public relations effort, much as the preliminary phases in the other state programs did. Also, the two county change-of-ownership inspection program in Clark and Washoe counties can be considered as a preliminary public relations program for the upcoming phase, which will require that all vehicles in the two counties undergo an annual inspection. By first requiring emission inspections for all new registered owners, Nevada could be avoiding a considerable number of complaints when compliance is required for all light-duty vehicles. (On January 1, 1980, the Clark County program became mandatory.) Other efforts include notices developed by the Department of Motor Vehicles and EPA pamphlets on I/M which are distributed to customers. There is no formal telephone "hot-line" but the Department of Motor Vehicles number is well publicized. The laboratory is available to diagnose problems -- one full-time person is required for this although his time is not all spent in public relations work. In addition, Department of Motor Vehicles personnel and county officials have made appearances on talk shows and set up booths at county fairs to provide visible support for the program and answer questions.

California's Phase I program was a voluntary effort in which 50,000 vehicles were tested. When Phase II of the MVIP began, the contractor placed prime time advertisements. Now, pamphlets are distributed describing the program and the available repair facilities. Do-it-yourself repair is discouraged. The contractor maintains a toll-free WATS line and customers can also call the Bureau of Auto Repair, which maintains a staff of 9 people to handle telephone calls. Some of these telephone calls are for the approval of waivers. A separate Challenge Station is not used but complaints can be investigated at the testing lanes. In addition, the change-of-ownership inspection functions as a sort of public information program, as in Nevada.

Like some of the other areas Rhode Island first implemented a mandatory inspection with voluntary maintenance (for the emission failures). When the maintenance became mandatory, the chief of inspection appeared on a panel discussion that solicited telephone input. Later, the local lung association received an EPA grant to develop pamphlets that are currently being distributed, along with EPA pamphlets, to customers of the licensed garages. One person in the Department of Environmental Management, whose responsibility it is to coordinate public education programs, devotes some time to promoting I/M for the state. Customers with problems may call the Department of Transportation. Also, the challenge station will check a customer's vehicle free of charge after the garage inspection. (A problem reported was that this service and, in fact, the existence of the challenge station has not received as much public attention as it should.)

Cincinnati offers telephone assistance to motorists but does not maintain a formal "hot-line" for them. Public relations in Cincinnati have improved during the program's operation. When the emission tests first began, the newspapers published several accounts of repair "horror stories." After a period of time, the press changed its view and began to support the program, including such feature coverage as showing former astronaut Neil Armstrong getting his car inspected.

8.2 Public Response

Generally the response of the public to I/M programs has been quite favorable. This is especially true after the initial implementation period is over and everyone has had a chance to get used to the program -- so that such obvious public annoyances as long waiting lines have been reduced.

In 1977, New Jersey commissioned a study of public response by the firm of Booz, Allen, and Hamilton. It showed that two-thirds of the public felt that the emissions inspection was fair. Thirty-two percent preferred less stringent standards; however, ten percent favored more stringent standards. Only thirteen percent felt that the program should be eliminated. The service industry also has responded well and responsibly to the demands of the program. This was aided by the good liaison between the state and the vocational programs that train auto service and repair technicians.

Oregon officials feel that the public has become much more accepting of the program there. In the beginning, there were a large number of minor customer hassles. These have virtually ceased now and significant numbers of customers seem to feel that their participation promotes not only better air quality but also better vehicle maintenance as well. The service industry has responded well and responsibly to the program; however, it was noted that mechanics could respond in greater numbers to the training sessions.

Between December 1977 and May 1979, three public response surveys were conducted in Arizona about the I/M program there. Support for the program has risen steadily throughout the period, with 58 percent of the people expressing an opinion now supporting it. Interestingly, support cuts across normal demographic lines. "Middle-aged, middle-income people who work with their hands are least supportive although even these groups are about equally divided in their support or opposition. On the other hand, groups most favorable are younger, college-educated people and newer arrivals in the state. Females tend to be slightly more supportive than men." (from the attitudinal study by Dr. Bruce Merrill)

From February 23 to March 4, 1979, a similar study was conducted by the same public opinion surveyors for the State of California. This study showed strong support among all sectors of the public for annual emissions inspections of motor vehicles, with two-thirds in favor and 20 percent opposed. There was also a strong correlation between those who felt that the problem of smog was significant (77 percent) and those who felt that cars should be inspected (72 percent of the above). Many people were concerned about the way the inspection program was set up and run. Twice as many people favored the use of state stations instead of private garages for the inspections. (54 to 26 percent). (Credit is given to Dr. Bruce Merrill for these results.)

Unfortunately, Nevada's I/M program has received largely negative response from both the press and the customers. In January, 1980 the county commissioners were considering eliminating the program and voted to cancel a $30,000 EPA-funded publicity campaign which was intended to improve its image. Among the criticisms leveled were that the state Department of Motor Vehicles should have taken responsibility for the program instead of using private garages and that it should have been enacted state-wide instead of on a county basis.

Subsequently, realizing that these moves put the survival of the program in grave jeopardy, the commissioners reconsidered and voted 6 - 1 to keep it. The EPA publicity campaign was also accepted and so the situation seems to have been given new hope. In any new program, the public must feel that the officials responsible for instituting it are firmly in support of it. As an editorial in the Las Vegas Sun remarked at the time, "The commissioners should either back it or scrap it. After all, it's theirs."

The EPA of Region I commissioned a public opinion survey of customers and service industry personnel about the I/M program in Rhode Island. An overwhelming majority of motorists felt the program was necessary (87.5%) and a significant majority had a preference for the private garage system (68.5%) and interesting contrast to the opinions reported above from California and Nevada. Most had the inspections performed by a garage where they had other maintenance routinely done (69.4%) and almost all felt that the service personnel were competent. However, the majority (71%) were unaware of the existance of the state-run Challenge Station and, of those who were, 45% found its hours of operation inconvenient. Not surprisingly, a majority of the service industry personnel conducting the inspections (69%) were in favor of retaining the private garage approach to I/M. Seventy-six percent of them thought the $4 fee was too low (the average amount suggested was $8.40), and 52% thought that the low fee encouraged shortened and more cursory inspections.

9.0 AIR QUALITY IMPROVEMENTS

Air quality improvements have been attributed to I/M. New Jersey has reported an 8 percent per year monitored improvement in CO levels with I/M versus an estimated 5 percent improvement per year without it (see Figure 1.4). Oxidant reductions are less well quantified but many fewer violations of the 0.12 ppm ozone ambient air standard have been noted since the inception of the program (see Figure 1.5). Oxidant reductions are difficult to quantify since they can travel a long distance from their source before they disperse; therefore, New Jersey could be greatly affected by the HC emissions of neighboring states. Tailpipe HC emissions in 1979 are estimated to be 15 percent lower than without I/M. Estimated tailpipe CO emissions are 26 percent lower than without it. (These reductions were derived by Mobile I, EPA's program for estimating tailpipe emission as a function of failure rate and other parameters.)

Oregon estimates that CO levels have been reduced 20 percent from 1974 levels and HC by 15 percent, although the situation with monitoring is complex. These data indicate that Oregon will probably achieve compliance with the national air quality standard for CO five years earlier because of the I/M program than would have been possible without it. Tailpipe reductions for CO and HC are estimated to be 25 percent and 8 percent, respectively (from 1976 levels).

In Arizona, a 25 percent CO improvement has been quantified, corrected for the increase in vehicle miles traveled (5 - 7 percent per year); however, no improvement in ambient HC has been quantified. Based on test data, tailpipe CO concentrations have been reduced about 36 percent from 1976 levels. HC reductions are 56.3 percent at idle, 51.2 percent for the low speed cruise mode, and 47.5 percent for the high speed cruise mode.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

NEW JERSEY AMBIENT CARBON MONOXIDE AIR QUALITY

AND

MOTOR VEHICLE GASOLINE CONSUMPTION

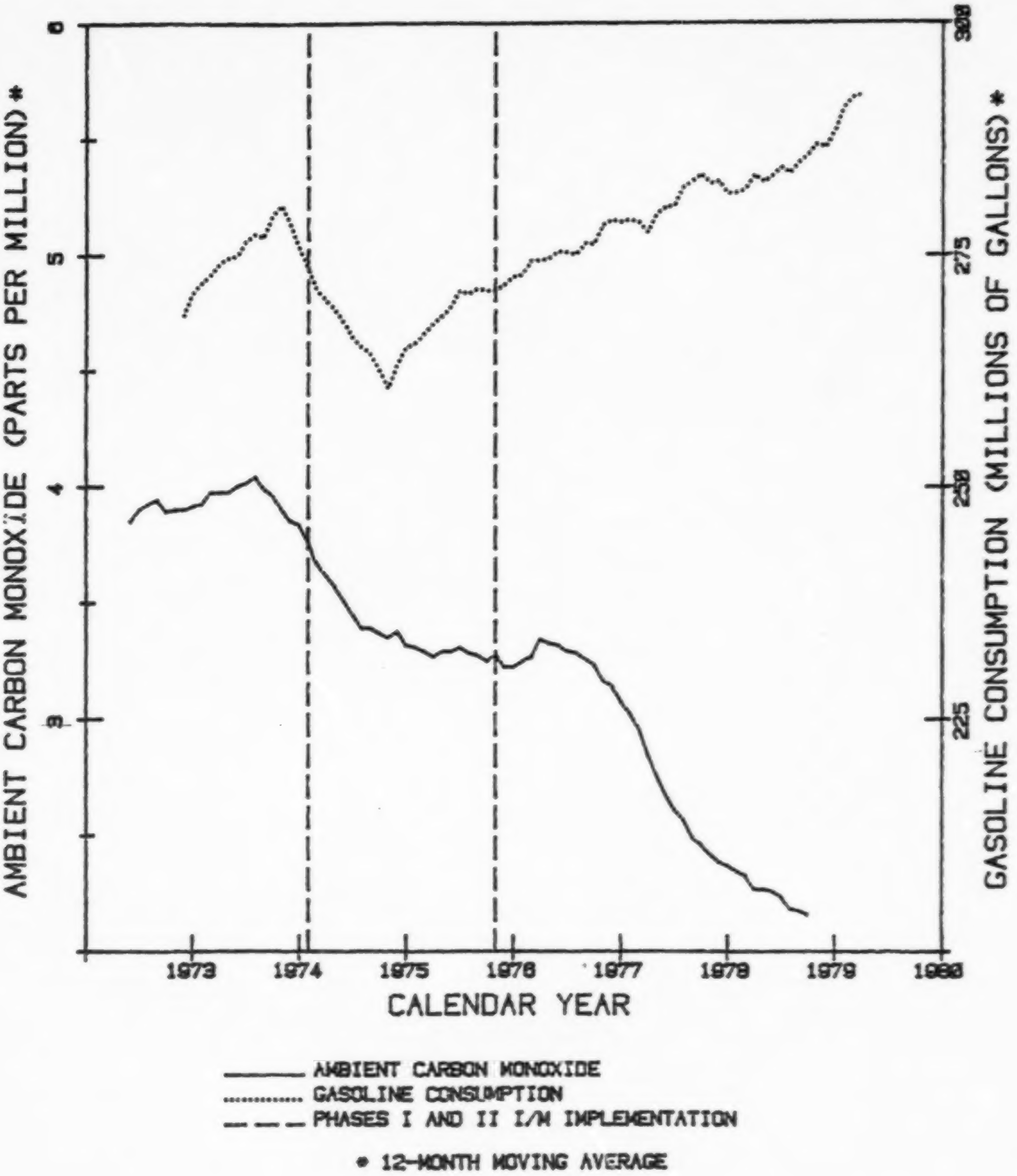

FIGURE 1.4

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR POLLUTION CONTROL

Composite Violations of 0.12 ppm Ozone Ambient Air Quality Standard for
Bayonne Trailer, Camden Trailer, Ancora, Asbury Park, Somerville

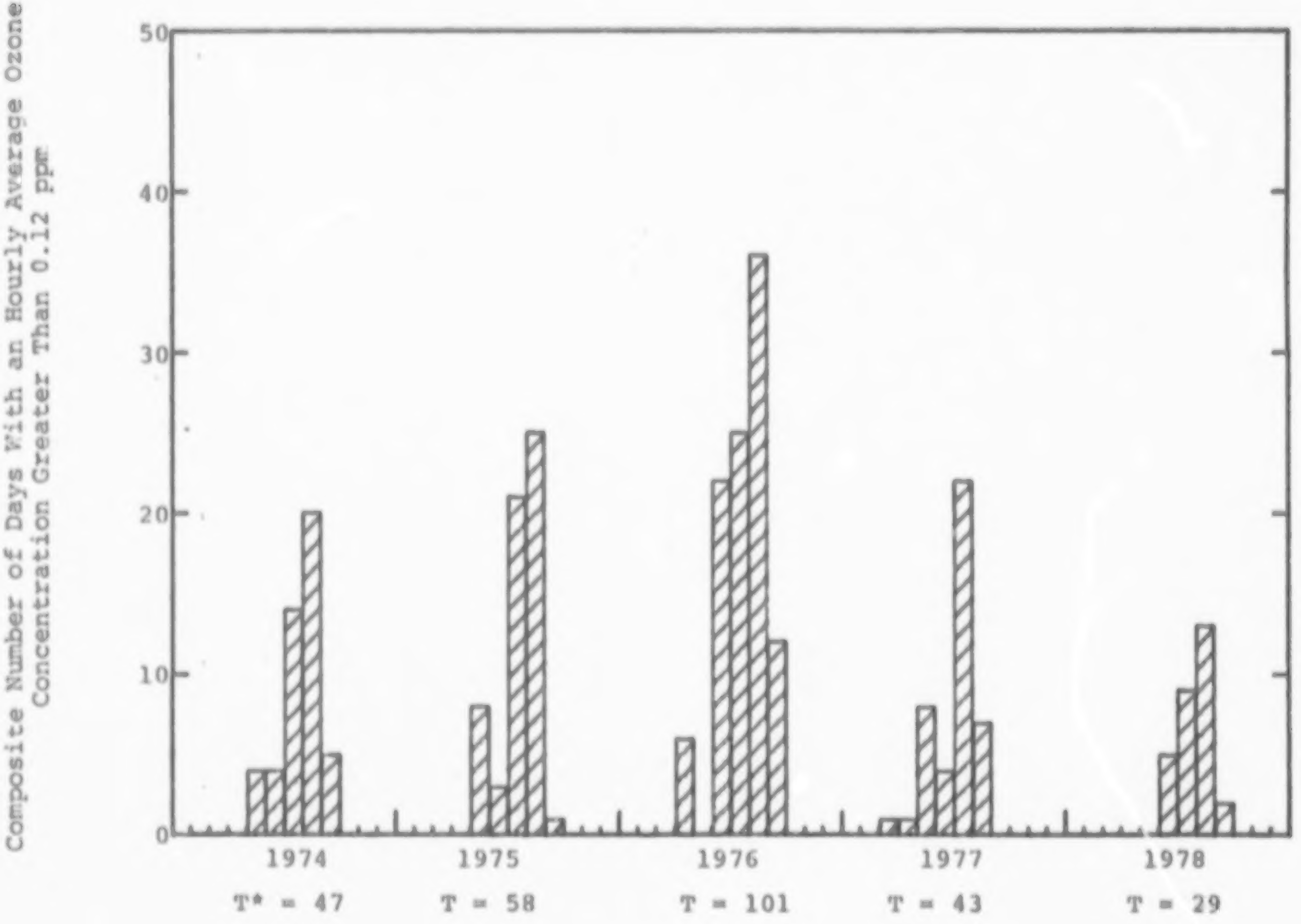

FIGURE 1.5

*T = Annual Total
Number of Days

Since the program has recently been implemented, California has not yet measured an improvement from monitoring data. However, tailpipe reductions noted in the change-of-ownership program (measured via FTP on inspected vehicles) are: 11 percent for HC, 15 percent for CO, and 2 percent for NO_X.

Nevada has also not quantified any improvements from monitoring data. However, tailpipe emissions are down 39 percent for CO and 33 percent for HC at idle, 27 percent for CO and 30 percent for HC at 2250 rpm from the pre-inspection levels.

SECTION TWO

SUMMARY TABLES

TABLE 2.0 DESCRIPTION OF OPERATING I/M PROGRAMS

ITEM	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	NEVADA	RHODE ISLAND	CALIFORNIA
Geographic Location	Entire State	Cincinnati & Norwood, Ohio	Portland	Pima and Maricopa Cty.	Clark and Washoe Cty.	Entire State	South Coast Air Basin (LA Area)
Date of Inspection Mandatory Voluntary	Feb. 1, 1974 July 5, 1972	Jan. 1, 1975	July 1, 1975	Jan. 1, 1977 Mandatory repairs Jan. 1, 1976 Mandatory Inspec. Voluntary repairs	Ch. of Owner 7-1-74 + New Regis. Owner 7-1-77 Annual (Clark Only) Jan. 1. 80	Jan. 1, 1979 Nov. 1, 1977	Mar. 19, 1979
Coverage (LDV-Light Duty Vehicle)	All LDVs less than 6000 lbs GVW	All LDVs less than 6000 lbs 160,000 vehicles	All vehicles 500,000 vehicles	All vehicles 1,200,000 vehicles	All LDV's less than 6000 lbs GVW. 330,000 vehicles	All LDVs less than 8000 lbs GVW. 500,000 vehicles	All LDV's less than 8500 lbs GVW. 1,200,000 vehicles
Exemptions	Diesels, vehicles less than 50 cu. in., pre 68 2 stroke Saabs, new cars for first 2 years.	Diesels (emissions only). Motorcycles, Historical veh's (over 25 years, collectors item)	HDV diesels over 8500 lbs GVW, motorcycles farm plated vehicles, fixed & restricted load vehicles. Interstate vhls	Vehicles over 13 years old. Prorated vehicles (Interstate vehicles)	65 and over 13 years old. Prorated vehicles (Interstate vehicles)	Diesels, new vehicles for 12 months or 12,000 miles. Farm vehicles over 25 years old, motorcycles	Diesels, motorcycles, dual fuel or complete fuel conversions
Type of Program	Centralized-State Oper.	Centralized-City Oper.	Centralized-State Oper.	Centralized-Contractor-Oper.	Decentralized - Private Garage	Decentralized - Private Garage	Centralized-Contractor
Administrating Agency	DMV/ N.J.D.E.P.	Cinn. Dept. of Sewers	Ore. D.E.Q.	Bur. of Veh. Emission Inspec., Div. of Environ. Health Services	D.M.V.	R.I.D.O.T.	Bur. Auto Repair/ Air Res. Board
Number of Inspection Stations	38 stations 60 lanes 4778 reinspection sta.	Cinn. - 1 Station, 4 lanes Norwood - 1 station, 1 lane	7 stations 16 lanes (1 state owned, 6 leased)	12 stations 36 lanes 1 mobile facility	90 in Washoe, 163 garages in Clark	Licensed 900 private garages	15 permanent 2 mobile 46 lanes
Can Fleets Self Inspect?	No	No	Yes 50 stations	Yes 300 stations	Yes (Incl. above)	Yes (Incl. above)	Yes 799 stations
Inspection Frequency	Annual	Annual	Biennial-LDV's Annual-HDV's	Annual	Change of Owner/Annual (Clark Cty Only)	Annual	Change of Owner/ New registered owner
Inspection Modes							
Idle HC & CO	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail[1]	Pass/Fail	Pass/Fail	Pass/Fail
2500 RPM HC & CO			Condition Veh/ Data Collection		Condition Veh/ Data Collection		Collection Veh/ Data Collection
Loaded HC & CO				Condition Veh/ Data Collection			Planned
NO_x							Planned
Exhaust Dilution (CO_2)	Planned		Pass/Fail (5%)	Pass/Fail (4.5%)			Pass/Fail (4.5%)
Idle Speed			Pass/Fail		Check & Adjust		Pass/Fail
Diagnostics or other Engine Parameters				-	Check & Adjust		
Smoke	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail (HD diesel only)	Pass/Fail	Pass/Fail	Pass/Fail
Tampering			Pass/Fail		Pass/Fail		Pass/Fail
Safety	Pass/Fail	Pass/Fail				Pass/Fail	
Enforcement/Fines	Sticker & Registration $100 max.	Sticker Cinn. $11-35 Norwood $15	Registration $100 max	Registration $8 late regis.	Registration Up to 6 mo. and $500	Sticker - Road Checks $15	Registration finable offense (variable)
Reinspection	At lanes or Licensed Private Reinspection Stations	At Lanes	At Lanes	At Lanes	Vehicle Adjusted when inspected 98% pass	At Garages	At Lanes
Hours of Station Operation	8-5 M-F some Saturday and nights	8-7 M-F	8-6 Tues - Sat	Metro 8 - 3:30 - MWF 8 - 7:00 - T-Th	Varies for Garages	Varies for garages. Challenge station open 7:30 - 3:30 M-F	Flexible - usually 8-4:30 T - F 8-7:00 M
Waiting Times (Max., Avg.)	Avg-6 min. Max-15 Min.	Usually no wait	Avg-15 min (varies greatly thru year) Max - 30 min	Avg-10 min Max - 1 hr. Wait info. available by Phone	Customer usually leaves car	Customer usually leaves car	Avg-10-15 min. Max - 1 hr + Wait info. avail. by phone
Queing Lengths	-		-	-	-	-	7 car min.
Inspection Time	5-10 min. 1 min for emissions	3-5 min.; 45 seconds for emissions.	3-5 min.	3 min	20 min	30-60 min. including safety	6 min
Inspection Cost	$2.50 (incl. safety) $1.00 for reinspection at private garages	$3.75 (incl. safety) Free retests	$5.00 Free retests	$5.00 incl. one free retest	$12.50 - 17.00	$4.00 including safety	$11.00 $7.00 reinspection

[1] Transmission in "drive" (neutral on manual transmission)

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TABLE 2.1 VEHICLE COVERAGE

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Light Duty Vehicle and Trucks (% or No.)							
GVW Limit	6,000 lbs	6,000 lbs	8,500 lbs	6,000 lbs	8,500 lbs	6,000 lbs	8,000 lbs
Gasoline (#/year)	3,800,000	145,000	475,000	1,067,000	1,200,000 est.	Washoe Cty. (Ch. of owner) 30,000 Clark Cty. (annual) 300,000	500,000
Diesel (#/year)							
Total LDVs and LDTs	3,800,000	145,000	475,000	1,067,000	1,200,000 est	330,000	
Heavy Duty Trucks							
Gasoline (#/year)	Planned	Not covered	25,000 (No GVW limit)	140,000 (est) (No GVW limit)	Not Covered (Covered under decentralized Blue Shield Pro.)	Not Covered	Not covered for emissions
Diesel (#/year)			Not covered				
Total			25,000	140,000			
Motorcycles (#/year)	Not covered	Not covered	Not covered	Incl. w/LDV's	Not covered	Not covered	Not covered
Total Number of Vehicles Tested	3,800,000	145,000	500,000	1,200,000 (est.)	1,200,000 est	330,000	500,000

TABLE 2.2.1 PERSONNEL REQUIREMENTS FOR NEW JERSEY

	DEPARTMENT	NUMBER	SALARY RANGE ($/YR)	COMMENTS
ADMINISTRATIVE				
General Supervisors	DMV	4	$26,000	Safety also
Station Supervisors	DMV	18	16,000	Safety also
Assistant Supervisors	DMV	54	14,000	Safety also
Chief	DMV	1	26,000	Safety also
Clerical & Secretarial	DMV	8	11,000	
TECHNICAL				
Supervisor	DEP	1	$28,000	
Analysts	DEP	1	19,000	Emissions inventories and data analyses
Trainers	DEP	2	$13,000 - 15,000	Also diagnostic and P.I. Assistance
Field Technicians	DEP	5	10,000 - 17,000	Data collection, analyzer calibration
Laboratory Technicians	DEP	3	10,000 - 15,000	R&D, analyzer repair, FTP
Engineers	DEP	3	15,000 - 28,000	Manager functions, regulatory policy, liaison w/other agencies, special studies and projects, stds eval.
Clerical & Secretarial	DEP	1	11,000	
ENFORCEMENT				
Examiners	DMV	520	12,000	Safety also
State & Local Police	Police			
Garage Investigators	DMV	45	15,000	
Senior Investigators	DMV	5	16,000	
Supervisor, Garage Investigators	DMV	1	20,000	

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TABLE 2.2.2 PERSONNEL REQUIREMENTS FOR CINCINNATI AND NORWOOD

	DEPARTMENT	NUMBER CINCINNATI/NORWOOD	SALARY RANGE CINCINNATI/NORWOOD	COMMENTS
ADMINISTRATIVE				
Chief Inspector	Cincinnati Dept. of Public Works, Norwood Dept. of Public Safety	2/1-1/2	15,967/15,059	Safety Also
Cashier	"	3/2	13,589/11,939	Safety Also
Superintendent	"	1/1	21,478/19,202	Safety Also
Clerical & Secretarial	"	0/1	0 /13,229	Safety Also
TECHNICAL				
Maintenance	"	1/0	16,597/0	Safety Also
ENFORCEMENT				
Inspectors (Full Time)	"	32/22	13,226/14,165	Safety Also
Inspectors (Half Time)	"	0/4	0 /6,306	Safety Also

TABLE 2.2.3 PERSONNEL REQUIREMENTS FOR OREGON

	DEPARTMENT	NUMBER	SALARY RANGE ($/YR)	COMMENTS
ADMINISTRATIVE				
Station Supervisors	DEQ	9	$12,200 - 15,600	Environmental Tech. II (Lead Inspec.)
General Supervisors	DEQ	7	$16,400 - 21,060	Program Operations Manager A & B (Field Supervisors)
Director	DEQ	1	$23,100 - 29,400	Public Health Engineer/Supervisor
Clerical & Secretarial	DEQ	1	$ 8,900 - 11,200	
TECHNICAL				
Analysts				
Trainers				
Technicians				
Engineers	DEQ	2	$16,400 - 23,100 $20,700 - 26,700	Environmental Engineer Senior Environmental Engineer
Public Relations				
Clerical & Secretarial				
ENFORCEMENT				
Examiners	DEQ	48 (during even yrs, about 24 in odd yrs)	$11,200 - 14,100	Environmental Technicians (Inspectors)
Fleet Investigators	DEQ	1	$18,100 - 23,100	Fleet and Maintenance Supervisor (also analyzer maintenance)

TABLE 2.2.4 PERSONNEL REQUIREMENTS FOR ARIZONA

	DEPARTMENT	NUMBER	SALARY RANGE ($/YR)	COMMENTS
ADMINISTRATIVE				
Program & Project Specialist	Vehicular Emissions Inspection - Arizona Dept. of Health	1	$16,300 - 21,500	Administrative Officer
I/M Manager (Chief)	" "	1	$25,200 - 34,300	Engineering Background, also performs technical management
Asst. Chief	" "	1	$23,000 - 31,000	Engineer, also provides technical advise
Clerical & Secretarial	" "	6	$ 7,900 - 12,700	Includes accounting clerk
TECHNICAL				
Statistician	" "	1	$15,200 - 19,900	
Trainers	" "	4	$14,000 - 18,500	
Technicians (field & diagnostic)	" "	7	$14,000 - 18,500	Laboratory diagnostics, fleet & contractor inspection, waiver surveillance
Envir. Health Spec.	" "	3	$15,200 - 19,900	Master gas analysis, inst. repair
Engineers	" "	1	$21,000 - 28,000	Q.A. manager (note 2 engineers have admin. functions)
ENFORCEMENT				
Examiners	" "	3	$14,000 - 18,500	Inspection of government vehicles
Fleet & Contractor Investigators	" "	-		Above Technicians

TABLE 2.2.5 PERSONNEL REQUIREMENTS FOR CALIFORNIA

	DEPARTMENT	NUMBER	SALARY RANGE ($/YR)	COMMENTS
ADMINISTRATIVE				
Asst. Chief	BAR	1	31,200	Sacramento (BAR Hdqtrs) 1/2 MVIP
Admin. Officer	BAR	1	23,000	Sacramento
Prog. Coordinator	BAR	1	28,000	Sacramento
Regional Manager	BAR	1	26,000 - 32,000	Senior Engineer (mainly admin.)
Clerical & Secretarial	BAR	11	9,000 - 14,000	4 in Sacramento
Clerical	ARB	1/2	11,000 - 13,220	
Complaint Handling	BAR	5	16,600 - 20,412	Answer technical questions
Telephone Screening	BAR	4	9,650 - 11,500	
TECHNICAL				
Technical Director	BAR	1	29,000	Sacramento
Engineers	BAR	4	28,000	Sacramento
Trainers	BAR	4		Coordinate training in S.C.A.B.* (not strictly MVIP)
Engineer/Analyst	ARB	1	19,000 - 23,000	Cost benefit analysis
Field Representative	ARB	1/2	16,700 - 20,500	Investigate I/M related complaints
ENFORCEMENT				
Supervisor Contractor Investigation	BAR	1	20,800 - 25,200	
Contractor Investigators	BAR	6	18,200 - 23,000	
Supervisor Fleet Investigators	BAR	3	18,600 - 20,400	These people also conduct mechanic qualification seminars
Fleet Investigators	BAR	17	17,000 - 18,600	" "

*South Coast Air Basin

TABLE 2.2.6 PERSONNEL REQUIREMENTS FOR NEVADA

	DEPARTMENT	NUMBER Clark Cty/Washoe Cty	SALARY RANGE ($/YR)	COMMENTS
ADMINISTRATIVE				
Program Supervisors	DMV	1 / 1	16,000 - 20,000	Automotive Background
Office Management	DMV	1 / 1	10,400 - 14,300	Run office
Keypunch	DMV	2 / 1	9,500 - 12,900	Data entry
TECHNICAL				
ENFORCEMENT				
Emission Control Officers	DMV	4 / 2	12,900 - 17,500	Garage Q.A. inspectors, also diagnostic & waiver check
Emission Control Investigators	DMV	4 / 1	12,900 - 17,500	Investigate complaints, develop court cases against stations

TABLE 2.2.7 PERSONNEL REQUIREMENTS FOR RHODE ISLAND

	DEPARTMENT	NUMBER	SALARY RANGE ($/YR)	COMMENTS
ADMINISTRATIVE				
Station Supervisors	DOT	4	$11,346 - 13,082	Senior auto and emission control inspectors
General Supervisors	DOT	1	12,657 - 14,787	At Challenge Station
Chief	DOT	1	17,000 - 19,000	
Asst. Chief	DOT	1	14,000 - 16,000	
Clerical & Secretarial	DOT	8	8,000 - 10,000	
TECHNICAL				
ENFORCEMENT				
Inspectors	DOT	6	10,930 - 12,601	Bus and Truck Safety at Challenge Station
State and Local Police	Police			
Garage Investigators	DOT	31	10,560 - 12,069	Auto and Emission Control Inspectors

TABLE 2.3 FAILURE RATE AND REPAIR COSTS

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Failure Rate	18% (1979)	18% (1979)	40% (1979)	25% (1979)	47% (1979) 27% Emissions	32%(1978) - B 4%(1978) - A	Not Available
Refailure Rate	29% (1979)	Not Available	23% (1979)	34%(1979)	28% (1979)	Not Available	Not Available
Repair Cost Median Average	(1979) $17 $18.71 (2/3 below $28)	Not Available	80% of repairs under $30	(1979) $30	(1979) $32	(1979) $20.45	Not Available
Repair Cost After Refailure Median Average	Not Available	Not available	Not available	Not available	Not available	Not available	Not Available
Waivers							
Available?	Yes	No	No	Yes	Yes	Yes	Yes
Time Period	1 Year			1 Year	-	1 Year	1 Year
Stipulations	Motorist must document that a good faith effort was made to pass test.			Repair procedure, cost ceilings $25-67, $75 - 68-up	Repair performed by MVPC mech. cost ceilings. $50 (No ECS modif) Greater if veh. is modif.)	$25 parts ceiling, $75 parts & labor, (Not including catalytic converters) No missing converters	Motorist must make reasonable effort to pass - no visual tampering, parameters checked
Number (%)	Approx. 10/yr. 41 since the start of the program			Approx. 80,000 yr. (30% of failed veh)	Approx. 30,000/ yr (10% of failed veh.)	Approx. 5000 per year (2%)	None

A - After Adjustment B - Before Adjustment

TABLE 2.4 OPERATING COSTS

	NEW JERSEY (Incremental for I/M)	CINCINNATI (Incremental for I/M)	OREGON* (Incremental for I/M)	ARIZONA (Incremental for I/M)	CALIFORNIA (Incremental for I/M)	NEVADA (Incremental for I/M)	RHODE ISLAND Total for I/M and Safety
Vehicle Inspectors Salaries	$600,000 (reclassification to include I/M)	$50,000	$950,000	0			$200,000
Other Salaries (Supervisor, Q.A., Trainers, etc.)	1,400,000		330,000	389,000	$1,500,000	$201,000	760,000
Maintenance & Office Supplies	75,000		10,000	38,000	Incl. w/misc	$35,000 (15,000 for printing)	0
Travel	120,000		10,000	24,000	75,000	7,500	52,000
Data Processing	5,000			35,000	65,000		0
Leases			300,000	25,000	Incl. w/misc		
Miscellaneous			400,000 (payroll, acctg. word processing and other general DEQ charges)	6,000	760,000	$5,000 prep. of documented vehicles for enforcement	
TOTAL (Per Car)	$2,200,000 (.58)	$50,000 (.33)	$2,000,000 (4.00)	$492,500 (.41)	$2,400,000 (2.00)	$249,000 (.73)	$1,012,000 (2.02)

*Biennial

TABLE 2.5 CAPITAL COSTS

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Land				$99,000			
Test Facilities			$80,000				$750,000 bldg. improvements for safety test of public vehicles.
Analyzers & Calib. Materials	$250,000 (1972) 582,000 (1980)	$12,600	217,500				
Office Space/ Supplies				270,000			
Laboratory/Challenge Station						42,000	0 - Use safety facilities
Laboratory Equipment	100,000			150,000	10,000	20,000	10,000
Calibration Equipment	10,000						
Data Processing Equipment (Software development etc)	20,000				260,000		54,000
Vehicles	287,000				30,000	6,000	
Enforcement Equipment	40,000						
Public Information Material							20,000 (EPA funded)
TOTAL	$707,000 1,039,000 (1980)	$12,600	$297,500	$519,000	$300,000	$68,000	$834,000
(Per Car)	(.19)	(.08)	(.60)	(.43)	(.25)	(.20)	(1.67)

TABLE 2.6 EMISSION ANALYSERS AND OTHER TEST EQUIPMENT

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Emissions Analyzer	(New Analysers)						
Type of Analyser	Infra-red	Infra-red	Infra-red	Infra-red	Infra-red	Varies from garage to garage	Varies from garage to garage
Make/Model	Sun 3021	Sun 910I	Sun OEA-75	HTS	HTS		
Stock or Modified	Modified	Modified	Modified	Modified	Modified		
Display	Digital	Dial	Digital	Print-out	Print-out		
Measures							
HC, CO	X	X	X	X	X		
CO_2	X		X	X	X		
Automatic or Manual Data Recording	Manual (can be used with aux printout)	Manual	Manual	Auto	Auto		
Number On-Line	106	5	18	1 per lane (37 total)	1 per lane (45 total)		
Number of Spares	19	4	11 (1-2 spares per station)	0	0		
Cost	$4,656 (1980)	$1,400	$7,500	Not available	Not available	Not available	Range $900-$7000 Avg. $2,149
Tachometer							
Make/Model			Part of above analysers		Part of analyzers		
Pick-Up			Clip to plug wire		Clipped to plug wire		
Display			Digital		Printout		
Cost							
Calibration Equipment (Cost)							
Hoses & Accessories	X ($10,000)		X	X	X	X	X
Gases	X ($75,000/yr)		X ($10,000/yr)	X	X	X ($3,000/yr)	X
Other Equipment			Analyzer	Horiba Analyzer PIR 2000 Beckman 6800 A.Q. Chromatograph (20,000)			Master analyzer at Challenge Station Horiba D400 - also used for challenge checks
Opacity Equipment (Cost)							
Type	Visual		Photographic film to determine visual levels	Visual (Smoke school)	Visual	Visual	Visual 0
Enforcement Equipment							
Portable Analyzer							
Type	Chrysler III						2
Number	20						Not Available
Total Cost	$40,000						Master Analyzer
Other							
Automatic Data Processing Equipment							
Type	Paper tape Printout						
Number	5						
What is Recorded?	Test data stds, test readings						
Cost							
Other Equipment	Sun 2001 for diagnostic work			Clayton Dynamometers	Plan to install Clayton Dyno's for loaded testing	Laboratory diagnostics Sun 2001 ($20,000) also used for Challenge checks	

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TABLE 2.7 QUALITY ASSURANCE PROGRAMS

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA		CALIFORNIA		NEVADA	RHODE ISLAND
				Contractor	Fleet	Contractor	Fleet		
Analyzer Calibration									
Frequency	1/mo min - 1.5/mo average	1/mo.	5/day	Weekly	Mfr's Recomm.	Weekly	Weekly	No requirements. Will get analyzer calibrated by Mfr. if red tagged	Weekly
Responsibility	State officials (DEP)	Service Contract with Manuf. ($32 per analyzer per month)	Lead inspector	Contractor	Fleets	Contractor	Fleets		Garage Personnel
Span-gas-checked for Traceability	Yes	No	Yes	Yes	Yes	Yes	Yes		If offsets are found at the garages
Documented Procedures	Yes	No	Yes	No	No	Yes	Yes		No
Set Span and Zero of Analyzer	Twice/day, new analyzers will be set automatically	Hourly	As needed, at least 5/day	Auto	Per Mfr's recomm.	Auto		Before each test	Garages are supposed to set before each test.
Station Inspection	(Reinspection Sta.)		(Fleets)						
Frequency	1/2 mo.		Monthly	2/mo.	Every 90 days	2/mo.	Every 60 days	Monthly	Monthly
Announced or Unannounced	Unannounced		Both	Unannounced	Unannounced	Unannounced	Unannounced	Unannounced	Unannounced
Responsibility	State officials (DMV) 1/100 sta.		State Official (DEQ) 1/50 sta.	State Official	State Official 1/150 sta.	State Offi-ials 1/10 lanes	State Offi-cials 1/40 stations	DMV Officers 1/75 sta.	DOT Officials 1/30 sta.
Function									
Check Analyzer	X		X	X	X	X	X	X	Calibration Demos. X (Calibration)
Check Records	X (Calibration)		X (Calibration)		X (Calib.)	X	X	X	X (calib.)
Collect Forms	X		X		X		X	X	X
Others				X (House-keeping)		X (Data recording equipment) system leak check	X Repair procedures & diagnostic ability	Look for repair books	
Std. Inspection Procedures	No		No		No	Yes			No
Use of Challenge Station or Laboratory	Used for maintenance & repair of analyzers (Major repairs are performed by Mfr.)		Master analyzer used for gas checks	Use for quality control of calibration gases.				Used to check complaint & all waiver vehicles Approx. 20 complaints/month	Used to check accuracy of inspection. Not well publicized. 20 vehicles checked in 1979 (6 passed)
Data Analysis	Failure rates at the stations are analyzed		Failure rate per station	Mainly used to verify charges		Repair data used to check performance of garages and/or mechanics			
Spot and Roadside Checks	Look at reinspection records & check vehicles with unusual repairs	No	No	Waiver surveillance. About 50% of waiver cases are critically reviewed - mechanics get notification at times		Yes - Selected certified vehicles are reinspected at fleets		Yes - Officials submit tampered cars for inspections	Yes - Safety checks with some emissions checks are made. Non-complying vehicles must be repaired or possibility of fine.
Other Q.A. Tasks	Approve analyzers for repair, independent sampling of vehicles.	Comparison checks made on analyzers	Unannounced monthly calibration run. Cross reference testing of analyzers from different sta.	Certify analyzers				Investigate garages as a result of complaints	Investigate garages as a result of Challenge sta. visits.

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TABLE 2.8 TRAINING PROGRAMS

TYPE OF TRAINING	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Mechanic Training							
Train Instructors	X (in past)	X (in past)	X	X (in past)	X		
Conduct Seminars				X	X		
On-Site Instruction				X			
Sponsor Vocational Training	X (in past)		X		X		
License/Certify Mechanics					X		
Number (%) Certified by NIASE (Entire state)*	2,982 (16%)	-	1,136 (20%)	964 (20%)	7,176 (15%)	239 (20%)	312 (13%)
% of Mechanics Trained							
Inspector Training	At beginning of I/M, N.J held several 1 day sessions on use and maintenance of analyzers	Sun Electric Corp. trained personnel in operation of analyzer	One week training program with tape and slides	Contractor trains personnel. Fleet inspectors trained by state. 7 hr course	Contractor trains personnel. Fleets-Class A mech. plus 2.5 hr inspector train.	No formal training; however test req'd & vo-tech train. to be cert.	15 hr course 4 hrs on emissions analyzers
Supervisor Training			None (except for continual)		None (except for continual)		20 Hr. in-house program
Training for Station Inspectors or Quality Auditors	DEP personnel trained in test procedures and the calib. & oper. of the analyzers. Investigators trained in calibration procedures				Trained for approx. 1 month by working with other inspectors		20 Hr. in-house program - mostly safety oriented

*Source; NIASE

TABLE 2.9.1 TRAINING DETAILS FOR NEW JERSEY

	GARAGE INVESTIGATORS
Source of Curriculum	In-House
Course Length	2 Weeks
Topics Covered (% of time devoted to each)	Calibration procedures; Regulations; Investigation techniques
Training Method (% of time)	Classroom
Number Trained	45 (Former examiners prior to I/M)
Manpower Requirements to Administrating Agency	1 man-month (one shot effort)
Certification Procedures/ Requirements	
Refresher Requirements	New employees get on the job training

TABLE 2.9.2 TRAINING DETAILS FOR OREGON

	STATE INSPECTORS	FLEET INSPECTORS	MECHANICS
Source of Curriculum	In-House	In-House	C.S.U. Program
Course Length	One week	2-1/2 days	Variable
Topics Covered (% of time devoted to each)	1. Program background 2. Air pollution causes and controls 3. Releasing loads 4. Clerical skills & handwriting	1. Air pollution causes and controls 2. Inspector skills 3. Forms	
Training Method (% of time)	Formal course with slides and tape recording. Procedures Manual available. Some hands-on instruction	Formal course with slides & tape recording. Some hands-on instruction	
Number Trained	20-50/year	30/year	
Manpower Reqirements to Administrating Agency	Program has been accredited by Clackamas Junior College. 6-12 manweeks per year DEQ requirement	15 mandays per year DEQ requirements	DEQ interfaces with community colleges and vocational schools (1/2 person)
Certification Procedures/Requirements			No licensing required - a drawback
Refresher Requirements			Subsequent courses available

TABLE 2.9.3 TRAINING DETAILS FOR ARIZONA

	MECHANIC TRAINING SEMINAR	ON-SITE INSTRUCTION	FLEET INSPECTOR	SMOKE SCHOOL
Source of Curriculum	In-House	In-House	In-House	In-House
Course Length	4 Hours	Varies, usually 2 hours	7 hours	4 hours
Topics Covered ($ of time devoted to each)	Mainly carburetor adjustment by propane enrichment. Some ignition diagnostics	Propane enrichment	Rules and Regulations, Engine diagnostics, Analyzer operation and calibration	Opacity Determination
Training Method (% of time)	Classroom - 1 hour Hands-on - 3 hours	Hands-on	Classroom - 5 hours Hands-on - 2 hours	Classroom/ Demonstration
Number Trained	Approx. 250/year	Approx. 550/year	896	80
Manpower Reqirements to Administrating Agency	3 people - Full Time		1 person - full time	4 man hrs/month
Certification Procedures/ Requirements	None	None	Exam.	None
Refresher Requirements	None	None	Yearly recertification 4 hour course and exam	None

TABLE 2.9.4 TRAINING DETAILS FOR CALIFORNIA

	MECHANICS (Qualified & Qualified MVPC)	FLEET INSPECTORS
Source of Curriculum	CSU/BAR	In-House
Course Length	51 Hours	2-3 Hours
Topics Covered (% of time devoted to each)	Introduction to emission controls & and MVIP - 6 hrs; ignition theory - 12 hours; fuel system & controls systems - 21 hours: diagnostics - 12 hours + regulations for qualified MVPC	Use and calibration of the analyzer, filling out of forms, emissions control systems identification
Training Method (% of time)	Classroom - 70% Demos/hands-on - 30%	On site training, mainly hands on
Number Trained/ Certified	400 actually were trained/ 5400 took examinations and passed	800 fleets certified
Manpower Requirements to Administrating Agency	24 manhours/month to conduct certification seminars	2-3 manhours per certified station
Certification Procedures/ Requirements	Class A (Qual. MVPC): $10 Cert. fee, exam only - no hands on. Qualified: exam - no fee. Approx 53% pass rate	Need Class A license plus qualified status
Refresher Requirements	Class A facilities, 4 year license; to maintain qualified status, exam every 3 years.	Same re-exam as Class A facilities.

TABLE 2.9.5 TRAINING DETAILS FOR RHODE ISLAND

	INSPECTORS (Private Garages)	GARAGE INVESTIGATORS
Source of Curriculum	In-House	State
Course Length	15 Hours	20 Hours
Topics Covered (%of time devoted to each)	Safety - 11 hours, Emissions testing - 4 hours (1 hour to forms, 1 hour to basic understanding of analyzers)	Safety (16 hours), Emission Analyzers Calibration problems. Causes of high HC and CO
Training Method (% of time)	Emissions only - 60% classroom 40% hands-on	Classroom
Number Trained	Over 3,000	53 - all DOT inspection personnel
Manpower Requirements to Administrating Agency	2 DOT personnel @ first 15 hours/ week. Now 15 hrs/ month	None. Conducted by R.I. Trade School
Certification Procedures	Complete course	None
Refresher Requirements	None	None

TABLE 2.10 DATA COLLECTION

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Data Collected (A = All inspected vehicles) (R = Roadside Checks) (S = Survey or Sample)							
Pass/Fail (Initial)	A	A	A	A	A	A	A
Pass/Fail (re-exam)	A		S	A	A		
Idle HC and CO							
Before Repair	S	A	A	A	A	A	R(biased for safety)
After Repair				A	A	A	
2500 RPM HC and CO							
Before Repair			A		A	A	
After Repair					A	A	
Loaded Mode HC and CO							
Before Repair				A			
After Repair				A			
Tampering Results			A		A	A	
Smoke Test	S		A		A		R
Engine Parameters			A	A	A	A	
V.I.D.		A		A	A	A	A & R
Make & Year of Vehicle	S	A	A	A	A	A	A & R
Engine Size/Family	S		A			A	
Repair Costs	S		S		A	A	
Odometer	S	A		A	A	A	A
Method of Collecting Data	Lane data - manual; survey data semi-automatic		Collected Manually	Test data automatic, Vehicle Info. semi-automatic	Test data automatic, Other data manual & semi-auto.	Manual & semi-automatic	Collected Manually
Method of Storing Data	Cards → Tape Tape → Disk		Hard-copy	Tape	Tape	Forms → Tape	Currently hard-copy developing programming

TABLE 2.11 DATA ANALYSIS

	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Analysis and Reports (A = All inspected vehicles) (R = Roadside checks) (S = Survey or Sample)							
No. of Inspections	A	A	A	A	A		
Failure Rate							
Overall	A	A	A	A	A	A	
By Inspection Sta.	A	A	A	A	A		
By Pollutant	S		A		A		R
By Model Year	S		A	A	A		R
By Make & Model Year	S		S	A			
Re-Exam Failure Rates							
Overall	A		S	A	A		
By Inspection Sta.	A			A	A		
By Pollutant					A		
By Model Year				A	A		
By Make & Model Year				A			
Average Idle HC and CO							
Before Repair							
Overall	S			A	A	A	R
By Model Year	S			A	A	A	R
After Repair							
Overall				A	A	A	
By Model Year				A	A	A	
Average 2500 RPM HC & CO							
Before Repair							
Overall					A	A	
By Model Year					A	A	
After Repair							
Overall					A	A	
By Model Year					A	A	
Average Loaded HC & CO							
Before Repair							
Overall				A			
By Model Year				A			
After Repair							
Overall				A			
By Model Year				A			
Repair Costs	S		S	S	A	S	
Other Analysis	Data base maintained on survey data and accessed as needed. Waiting time survey		Type of repair, waiting time	Additional analysis (e.g., CO failure rate data for '79 GM vehicles)	Cost effectiveness using actual FTP results for certain cut points. Repair data by Mech & repair facility.	Data base maintained on test data and accessed as needed	

TABLE 2.12 PUBLIC INFORMATION

TYPE OF PROGRAM	NEW JERSEY	CINCINNATI	OREGON	ARIZONA	CALIFORNIA	NEVADA	RHODE ISLAND
Preliminary/ Voluntary Test Programs	1-1/2 year program Mandatory inspection Voluntary Maintenance		1 year voluntary program	1 year mand. inspection/ voluntary maintenance	Phase I voluntary program. 50,000 vehicles tested	Voluntary testing sponsored by Lung Assoc. and DMV	1 year mand. inspection/ voluntary maintenance
Pamphlets	Developed by EPA and state	Distribute EPA handbook at first. Currently distribute their own pamphlet	Developed by state & EPA. Reminder with registration forms.	Developed by state, EPA, & contractor	Distribute pamphlet describing program & repair facil. Do not encourage do it yourself repair	Notices dev't by DMV. Distribute EPA pamphlet	Lung Association developed pamphlets with EPA grant.
Use of Challenge Station or Laboratory	Laboratory is open by appointment			Approx. 10 veh/day have diagnostics performed at laboratory	Challenges made at lanes	Complaints, diagnosis	Customer may have vehicle checked for free after garage inspection. (rarely used)
Telephone Assistance (Consumer Hot-Lines)	DEP Personnel Answer questions and refer people to the laboratory	City and County personnel involved will answer questions	Public may call DEQ. No formal hot line	Contractor maintains toll free # (watts) Customers can call state.	Contractor maintains toll free # (watts). Customers can also call B.A.R.	DMV number is well publicized	May call DOT. No formal DDT hot line Lung Assoc. has hot line (rarely used)
Radio & Television Ads or Public Service Announcements				Contractor placed prime time ads (advise to avoid end of month)	Contractor placed prime time ads at beginning of program	DMV & county officials appear on talk shows	Chief appeared on question & answer shows
Other Programs	Press releases, Public van demonstrations. Provide customer with list of repair facilities	Press releases to improve relations	Press coverage, DEQ bulletins, bumper stickers	Press releases, opinion surveys	Press releases, opinion surveys	Set-up booth at county fair	Attempts to improve press relations. Attitidinal survey sponsored by EPA Region 1
Manpower Requirements	15 hours/week for diagnostic technician	None	Less than 1 person	1 person - fulltime for diagnostic technician	ARB - 1 person, BAR- 9 people to handle complaints	1 person fulltime in labor. (not all P.I. work)	1 person in DEM coordinates public education programs. Other responsibilities

TABLE 2.13 TAMPERING INSPECTIONS

	OREGON	CALIFORNIA	NEVADA
Components Inspected (V-Visual Check, F-Functional Check)			
Catalytic Converter	V	V	V
EGR Valve	V	F	V
Air Injection System	V	V	V
PCV Valve	V	V	V
Thermostatic Air Cleaner	V	V	V
Oxygen Sensor			
Fuel Fillerneck	V (plug on site)	V (unless locked)	
Limiter Caps			
Exhaust System Modifications	V	V	Has to meet specs for model year
Engine Modifications	V		
Inspector Training	Covered in a one week training program	Contractor trained inspectors. Fleet inspection stations must employ a qualified mechanic.	None

TABLE 2.14 STAFF CONTACTS

	CONTACT	ADDRESS	PHONE
New Jersey	Daniel Cowperthwait	New Jersey State Dept. of Environmental Protection Labor and Industry Bldg. Room 1108 John Fitch Plaza Trenton, NJ 08625	(609) 292-6714
	R. W. McMinn Deputy Director	State of New Jersey Division of Motor Vehicles 28 S. Montgomery St. Trenton, NJ 08666	(609) 292-4593
Cincinnati	Joseph Rockford	Cincinnati Dept. of Public Works	(513) 352-3719
	Eugene Ermenc	S.W. Ohio Air Pollution Control Agency	(513) 352-4880
Norwood	Martin A. Ferris	Norwood City Hall Elm & Montgomery Streets Norwood, Ohio 45212	(513) 631-2700
Oregon	Ron Householder	Dept. of Environmental Quality Vehicle Inspection Program 522 S.W. Fifth Avenue Portland, Oregon 97401	(503) 229-6200
Arizona	Fred Iacobelli Chief	Arizona Dept. of Health Services, Bureau of Vehicular Emissions Inspection 1740 W. Adams Street Phoenix, Arizona 85007	(602) 255-1149
California	John R. Wallauch Regional Director	Dept. of Consumer Affairs Bureau of Automotive Repair 3415 Fletcher Ave, Suite 2 El Monte, CA 91731	(213) 575-7005
	John Urkov Field Representative	Air Resources Board Haagen-Smit Laboratory 9528 Telstar Avenue El Monte, CA 91731	(213) 575-6798
Nevada			
Las Vegas	Hon Crane	Dept. of Motor Vehicles 2701 E. Sahara Blvd. Las Vegas, Nevada	(702) 386-5356
Reno	Ken Boyer	Dept. of Motor Vehicles Emission Control Section 305 Galletti Way Reno, Nevada 89512	(702) 784-4776
Rhode Island	Al Massarone	R.I. DOT, State House, Room Providence, RI 02906 101	(401) 277-2983
	Tom Getz	Dept. of Environmental Management Health Bldg. Davis St. Providence, RI 02906	(401) 277-2808

APPENDIX A

COMPILATION OF EMISSION STANDARDS FOR I/M PROGRAMS

Page

Arizona A-2

California A-3

Nevada A-3

New Jersey A-4

Rhode Island A-4

Oregon A-5

Cincinnati A-14

COMPILATION OF EMISSION STANDARDS FOR I/M PROGRAMS

ARIZONA

TYPE	NUMBER CYLINDERS	YEAR	DIAGNOSTIC INFORMATION				PASS/FAIL INFORMATION	
			50 MPH (Approx)		30 MPH (Approx)		IDLE	
			HC ppm	CO%	HC ppm	CO%	HC ppm	CO%
MOST PASSENGER VEHICLES	4 or less	1975 and newer	100	0.90	120	1.00	250	2.5
		1972-74	380	3.00	380	3.50	450	6.0
		1968-71	450	3.75	450	4.25	800	6.5
		1967 and older	1000	5.00	1000	6.00	1800	7.5
	6 - 8	1975 and newer	100	0.90	120	1.00	250	2.2
		1972-74	300	2.50	300	3.00	400	5.5
		1968-71	380	3.00	380	3.50	750	6.5
		1967 and older	700	4.25	700	5.25	1200	7.5
TRUCKS & VANS, OVER 6000 GVW	6 - 8	1975 and newer	300	2.50	300	3.00	350	5.0
		1972-74	300	2.50	300	3.00	400	5.5
		1968-71	380	3.00	380	3.50	750	6.5
		1967 and older	700	4.25	700	5.25	1200	7.5

COMPILATION OF EMISSION STANDARDS FOR I/M PROGRAMS

CALIFORNIA

Acceptable Emissions Levels

Model Years	Emission Control System	Number of Cylinders	Standards HC (ppm)	Standards CO (%)
1955-65	—	5 or more	1100	8.5
1966-70	with air injection	5 or more	350	2.5
1966-70	without air injection	5 or more	500	6.5
1971-74	with air injection	5 or more	150	1.75
1971-74	without air injection	5 or more	350	5.5
1955-67	—	4 or less	1750	7.5
1968-70	with air injection	4 or less	400	2.5
1968-70	without air injection	4 or less	900	6.5
1971-74	with air injection	4 or less	250	1.75
1971-74	without air injection	4 or less	400	5.5
1975-79	catalyst	All	150	1.5
1975-79	non-catalyst	All	250	2.5

To these standards, a tolerance of 100 ppm HC and .5% CO has been added until more data have been collected.

NEVADA

Acceptable Emissions Levels

Model Year	HC ppm	CO%
1967 and earlier	1200	7.5
1968-69	600	5.0
1970-74	400	4.0
1975 and later	300	3.0

COMPILATION OF EMISSION STANDARDS FOR I/M PROGRAMS

NEW JERSEY

Acceptable Emissions Levels

Year	HC ppm	CO%
1967 and earlier	1400	8.5
1968-69	700	7.0
1970-74	500	5.0
1975 and later	300	3.0

Stiffer standards have been proposed but not adopted.

RHODE ISLAND

Acceptable Emissions Levels

Model Year	HC (ppm)	CO (%)
1967 or earlier	1600	10.0
1968-69	800	8.0
1970-74	600	6.0
1975-after	300	3.0

OREGON

LIGHT DUTY MOTOR VEHICLE EMISSION CONTROL IDLE EMISSION STANDARDS

(1) Carbon monoxide idle emission values not to be exceeded:

	Base Standard %	Enforcement to Tolerance Through June, 1979
ALFA ROMEO		
1978	0.5	0.5
1975 through 1977	1.5	1.0
1971 through 1974	3.0	1.0
1968 through 1970	4.0	1.5
pre-1968	6.0	0.5
AMERICAN MOTORS CORPORATION		
1975 through 1978 Non-Catalyst	1.5	0.5
1975 through 1978 Catalyst Equipped	0.5	0.5
1972 through 1974	2.0	1.0
1970 through 1971	3.5	1.0
1968 through 1969	5.0	0.5
pre-1968	6.0	0.5
Above 6000 GVWR, 1974 through 1978	2.0	1.0
ARROW, Plymouth - see COLT, Dodge		
AUDI		
1975 through 1978	1.5	0.5
1971 through 1974	2.5	1.0
1968 through 1970	4.0	1.0
pre-1968	6.0	0.5
AUSTIN - see BRITISH LEYLAND		
BMW		
1975 through 1978	1.5	0.5
1974, 6 cyl.	2.5	1.0
1974, 4 cyl.	2.0	1.0
1971 through 1973	3.0	1.0
1968 through 1970	4.0	1.0
pre- 1968	6.0	0.5

BRITISH LEYLAND

Austin, Austin Healey, Morris, and Marina		
1975	2.0	0.5
1973 through 1974	2.5	1.0
1971 through 1972	4.0	1.0
1968 through 1970	5.0	1.0
pre-1968	6.5	0.5
Jaguar		
1975 through 1978	0.5	0.5
1972 through 1974	3.0	1.0
1968 through 1971	4.0	1.0
pre-1968	6.0	0.5
MG		
1976 and 1978 MG	0.5	0.5
1975 MG, MG Midget and 1976 MG Midget	2.0	0.5
1973 through 1974 MGB, MGBGT, MGC	3.0	1.0
1971 through 1974 Midget	3.0	1.0
1972 MGB, MGC	4.0	1.0
1968 through 1971, except 1971 Midget	5.0	1.0
pre-1968	6.5	0.5
Rover		
1971 through 1974	4.0	1.0
1968 through 1970	5.0	0.5
pre-1968	6.0	0.5
Triumph		
1978	0.5	0.5
1975 through 1977	2.0	0.5
1971 through 1974	3.5	1.0
1968 through 1970	4.0	1.0
pre-1968	6.5	0.5

BUICK - see GENERAL MOTORS

CADILLAC - see GENERAL MOTORS

CAPRI - see FORD MOTOR COMPANY

CHECKER

1975 through 1978 Catalyst Equipped	0.5	0.5
1973 through 1974	1.0	1.0
1970 through 1972	2.5	1.0
1968 through 1969	3.5	1.0
pre-1968	6.0	0.5

CHEVROLET - see GENERAL MOTORS

CHEVROLET L.U.V. - see L.U.V., Chevrolet

CHRYSLER - see CHRYSLER CORPORATION

CHRYSLER CORPORATION (Plymouth, Dodge, Chrysler)

1975 through 1978 Non-Catalyst	1.0	0.5
1975 through 1978 Catalyst Equipped	0.5	0.5
1973 through 1974	1.0	1.5
1970 through 1972	1.5	1.5
1968 through 1969	2.0	2.5
pre-1968	6.0	0.5
Above 6000 GVWR, 1968 through 1971	4.0	1.0
Above 6000 GVWR, 1972 through 1978	2.0	1.0

CITROEN

1971 through 1974	3.0	1.0
1968 through 1970	4.0	1.0
pre-1968	6.0	0.5

COLT, Dodge

1978	0.5	0.5
1975 through 1977	3.0	0.5
1971 through 1974	5.0	1.0
pre-1971	6.0	0.5

COURIER, Ford

1975 through 1978	1.5	0.5
1973 through 1974	2.0	1.0
pre-1973	4.0	1.0

INTERNATIONAL HARVESTER

1975 through 1978	2.5	0.5
1972 through 1974	3.0	1.0
1970 through 1971	4.0	1.0
1968 through 1969	5.0	1.0
pre-1968	6.0	0.5

JAGUAR - see BRITISH LEYLAND

JEEP - see AMERICAN MOTORS

JENSEN-HEALEY

1973 and 1974	4.5	1.0

JENSEN INTERCEPTER & CONVERTIBLE - see CHRYSLER CORPORATION

LAND ROVER - see BRITISH LEYLAND, Rover

LINCOLN - see FORD MOTOR COMPANY

L.U.V., Chevrolet

1974 through 1978	1.5	1.0
pre-1974	3.0	1.0

MAZDA

1978 Catalyst Equipped	0.5	0.5
1975 through 1978 Non-Catalyst	1.5	0.5
1968 through 1974, Piston Engines	4.0	1.0
1974, Rotary Engines	2.0	0.5
1970 through 1973, Rotary Engines	3.0	0.5

MERCURY - see FORD MOTOR COMPANY

MERCEDES-BENZ

1975 through 1977 Non-Catalyst, 4-cyl.	1.0	0.5
1975 through 1978, all other	0.5	0.5
1973 through 1974	2.0	1.0
1972	4.0	1.0
1968 through 1971	5.0	1.0
pre-1968	6.0	0.5
Diesel Engines (all years)	1.0	0.5

MG - see BRITISH LEYLAND

OLDSMOBILE - see GENERAL MOTORS

OPEL

1975 through 1978	1.5	0.5
1973 through 1974	2.5	1.0
1970 through 1972	3.0	1.0
1968 through 1969	3.0	1.0
pre-1968	6.0	0.5

PANTERA - see FORD MOTOR COMPANY

PEUGEOT

1975 through 1978	1.5	0.5
1971 through 1974	3.0	1.0
1968 through 1970	4.0	1.0
pre-1968	6.0	0.5
Diesel Engines (all years)	1.0	0.5

PLYMOUTH - see CHRYSLER CORPORATION

PLYMOUTH CRICKET - see CRICKET, Plymouth

PONTIAC - see GENERAL MOTORS

PORSCHE

1978 Catalyst Equipped	0.5	0.5
1975 through 1978 Non-Catalyst	2.5	0.5
1972 through 1974	3.0	1.0
1974 Fuel Injection 1.8 liter (914)	5.0	1.0
1968 through 1971	5.0	1.0
pre-1968	6.5	0.5

RENAULT

1977 through 1978	1.5	0.5
1976 Carbureted	1.5	0.5
1975 and 1976 Fuel Injection	1.5	0.5
1975 Carbureted	0.5	0.5
1971 through 1974	3.0	1.0
1968 through 1970	5.0	1.0
pre-1968	6.0	0.5

ROLLS-ROYCE and BENTLEY

1975 through 1978	0.5	0.5
1971 through 1974	3.0	1.0
1968 through 1970	4.0	1.0
pre-1968	6.0	0.5

ROVER - see BRITISH LEYLAND

SAAB

1975 through 1978	1.5	0.5
1968 through 1974, except 1972 99 1.85 liter	3.0	1.0
1972 99 1.85 liter	4.0	1.0
pre-1968 (two-stroke cycle)	3.0	3.5

SAPPORO, Plymouth - see COLT, Dodge

SUBARU

1975 through 1978	1.5	0.5
1972 through 1974	3.0	1.0
1968 through 1971, except 360's	4.0	1.0
pre-1968 and all 360's	6.0	0.5

TOYOTA

1975 through 1978 Catalyst Equipped	0.5	0.5
1975 through 1978, 4 cyl.	2.0	0.5
1975 through 1978, 6 cyl.	1.0	0.5
1968 through 1974, 6 cyl.	3.0	1.0
1968 through 1974, 4 cyl.	4.0	1.0
pre-1968	6.0	0.5

TRIUMPH - see BRITISH LEYLAND

VOLKSWAGEN

1977 and 1978 Rabbit and Scirocco	2.0	0.5
1976 Rabbit and Scirocco	0.5	0.5
1976 through 1978 All Others	2.5	0.5
1975 Rabbit, Scirocco, and Dasher	0.5	0.5
1975 All Others	2.5	0.5
1974 Type 4 Fuel Injection 1.8 liter	5.0	0.5
1972 through 1974, except Dasher	3.0	1.0
1972 through 1974 Dasher	2.5	1.0
1968 through 1971	3.5	1.0
pre-1968	6.0	0.5
Diesel Engines (all years)	1.0	0.5

VOLVO

1978	0.5	0.5
1975 through 1977, 6 cyl.	1.0	0.5
1975 through 1977, 4 cyl.	2.0	0.5
1972 through 1974	3.0	1.0
1968 through 1971	4.0	1.0
pre-1968	6.5	0.5

NON-COMPLYING IMPORTED VEHICLES

All	6.5	0.5

DIESEL POWERED VEHICLES

All	1.0	0.5

ALL VEHICLES NOT LISTED AND VEHICLES FOR WHICH NO VALUES ENTERED

1975 through 1978 Non-Catalyst, 4 cyl.	2.0	0.5
1975 through 1978 Non-Catalyst, all except 4 cyl.	1.0	0.5
1975 Catalyst Equipped	0.5	0.5
1972 through 1974	3.0	1.0
1970 through 1971	4.0	1.0
1968 through 1969	5.0	1.0
pre-1968 and those engines less than 820 cc (50 cu. in.)	6.5	0.5

(2) Hydrocarbon idle emission values not to be exceeded:

PPM	Enforcement Tolerance Through June 1979	
No HC Check	--	All two-stroke cycle engines and diesel ignition
1500	100	Pre-1968 4 or less cylinder engines, 4 or less cylindered non-complying imports, and those engines less than 820 cc (50 cu. in.) displacement
1200	100	Pre-1968 with more than 4 cylinder engines, and non-complying imports with more than 4 cylinder engines
800	100	1968 through 1969, 4 cylinder
600	100	All other 1968 through 1969
500	100	All 1970 through 1971
400	100	All 1972 through 1974, 4 cylinder
300	100	All other 1972 through 1974
200	100	1975 through 1978 without catalyst
125	100	1975 through 1978 with catalyst

(3) There shall be no visible emission during the steady-state unloaded and raised rpm engine idle portion of the emission test from either the vehicle's exhaust system or the engine crankcase. In the case of diesel engines and two-stroke cycle engines, the allowable visible emission shall be no greater than 20% opacity.

(4) The Director may establish specific separate standards, differing from those listed in subsections (1), (2), and (3), for vehicle classes which are determined to present prohibitive inspection problems using the listed standards.

HEAVY DUTY GASOLINE MOTOR VEHICLE EMISSION CONTROL EMISSION STANDARDS

(1) Carbon Monoxide idle emission values not to be exceeded:

	Base Standard %	Enforcement Tolerance Through June, 1979
ALL VEHICLES		
Pre-1970	6.0	0.5
1970 through 1973	4.0	1.0
1974 through 1978	3.0	1.0

(2) Carbon monoxide nominal 2,500 RPM emission values not be be exceeded:

	Base Standard %	Enforcement Tolerance Through June, 1979
ALL VEHICLES		
Pre-1970	3.0	1.0
1970 through 1978	2.0	1.0
Fuel Injected	No Check	

(3) Hydrocarbon idle emission values not to be exceeded:

	Base Standard PPM	Enforcement Tolerance Through June, 1979
ALL VEHICLES		
Pre-1970	700	200
1970 through 1973	500	200
1974 through 1978	300	200

COMPILATION OF EMISSION STANDARDS FOR I/M PROGRAMS

CINCINNATI AND NORWOOD

Acceptable Emissions Levels

Cincinnati and Norwood

Model Year	HC ppm	CO %
Pre 1968	1000	6
1968-69	600	5
1970-74	500	4
1975-newer	250	1.5

APPENDIX B

LIST OF ARIZONA APPENDIX MATERIAL

	Page
Vehicle Inspection Report	B-2
Inspection Report Supplement	B-4
Failure Rate Summary	B-6
Volume and Failure Rates for Each Location	B-7
Failure Rates and Averages for Each Model Year	B-8
Average Emissions for Gasoline Fueled Vehicles in the First Six Months of 1979 Tested at Idle Mode for Carbon Monoxidie (%) and Hydrocarbons (PPM)	B-9
Average Emissions for Gasoline Fueled Vehicles in 1978 at Idle Mode for Carbon Monoxide (%) and Hydrocarbons (PPM)	B-10
Average Emissions for Gasoline Fueled Vehicles in 1977 at Idle Mode for Carbon Monoxide (%) and Hydrocarbons (PPM)	B-11
Repair Data	B-12

STATE OF ARIZONA 0000000

VEHICLE INSPECTION REPORT

CERTIFICATE BELOW NEEDED FOR REGISTRATION (CANNOT BE REPLACED IF LOST OR STOLEN)

Your vehicle's test results are shown below. If it uses gasoline, it was tested for hydrocarbons **(HC)** and carbon monoxide **(CO)**; pass or fail is based on the idle portion of the test. If it uses diesel fuel, it was tested for smoke emissions. If your vehicle failed, you are entitled to one free retest after repairs or adjustments have been made. To get the free retest, you must return within 60 days* with this report, signed on the reverse side, signifying that emission-related repairs or adjustments have been made.

***IMPORTANT: The free retest period does not change your registration deadline. An $8 late registration fee is charged if registration is processed after deadline. For registration instructions, see below.**

STATION NO.	LANE NO.	TEST MODE	TEST NO.	DATE	TIME

VEHICLE INFORMATION

LICENSE PLATE	VEHICLE IDENTIFICATION NO.	YEAR	MAKE	STYLE	FUEL	MILEAGE	VEH CLASS
						,000	

LOADED TEST EMISSION RESULTS

	HIGH CRUISE		LOW CRUISE	
	HC (PPM)	CO (%)	HC (PPM)	CO (%)
MAXIMUM ALLOWABLE				
TEST READING				

PASS/FAIL EMISSION RESULTS

	IDLE		DIESEL SMOKE
	HC (PPM)	CO (%)	OPACITY
MAXIMUM ALLOWABLE			
TEST READING			

FINAL RESULT

FOR OFFICIAL USE ONLY

P1 ID ☐ P2 ID ☐ P3 ID ☐ CLASS 2 ☐ NO OF REGIST ☐ CUST ☐ RE-TEST ☐ RE-PAIR ☐ FEE $ ☐

ARIZONA VEHICULAR EMISSION INSPECTION CERTIFICATE

PLATE ____ VIN ____ YEAR ____ MAKE ____

The above vehicle was emission inspected at station ________

on ________________ and ________________ the emission standards as established by regulation.

This certificate may only be used for registration purposes when either the word COMPLIANCE or WAIVER is printed in this block. → ☐

If the word TEST appears, see inspection report supplement.

THIS CERTIFICATE CANNOT BE REPLACED IF LOST OR STOLEN AND IS VOID WHEN ALTERED. 0000000

IF THE WORD **COMPLIANCE** OR **WAIVER** APPEARS IN THE BLUE BLOCK ON THE CERTIFICATE, TEAR ALONG THE PERFORATED LINES AND TAKE IT OR MAIL IT WITH YOUR REGISTRATION CARD TO THE COUNTY ASSESSOR. KEEP TOP PART CONTAINING THE TEST RESULTS UNTIL YOU RECEIVE LICENSE TAGS.

IF THE WORD **TEST** APPEARS, THE VEHICLE DESCRIBED HAS FAILED THE INSPECTION AND MUST BE REPAIRED ACCORDING TO INSTRUCTIONS ON THE REVERSE OF THIS FORM.

ARIZONA INSPECTION REPORT -- REVERSE

IF YOUR VEHICLE FAILS THE INITIAL EMISSIONS INSPECTION, YOU MUST HAVE IT REPAIRED AND EITHER PASS REINSPECTION OR QUALIFY FOR A WAIVER AS SPECIFIED BELOW. IN EITHER CASE, TO QUALIFY FOR A REINSPECTION OR BE GRANTED A WAIVER, REPAIR INFORMATION MUST BE PROVIDED BELOW:

TO BE FILLED OUT BY REPAIR FACILITY OR VEHICLE OWNER (Please Print)

Person or Facility Performing Repairs ____________________

Address ____________________ Phone No. ____________

REPAIR REQUIREMENTS	ADJUSTED	REPAIRED/ REPLACED
A. 1. Set dwell and timing to mfgr. spec.	☐	☐
2. Check air cleaner - replace if dirty	☐	☐
3. Check choke for proper operation - repair if necessary	☐	☐
4. Check PCV valve - replace if faulty	☐	☐
5. Check vacuum hoses for proper routing and leaks - repair if necessary	☐	☐
6. Set air fuel mixture to mfgr. spec.	☐	☐
7. Adjust idle speed to mfgr. spec.	☐	☐
B. 1. Check plug wires - replace if necessary	☐	☐
2. Check spark plugs - replace if necessary	☐	☐
3. Check distributor components - vacuum advance, distributor cap, rotor, points - replace if necessary	☐	☐
C. 1. Check float setting, power valve, needles, seat, jets: recair, replace as required.	☐	☐

Emission Related Repair Cost $ ____________

Date of Repair ____ / ____ / ____

Official Use Only ☐☐☐☐☐☐

If an NDIR analyzer was used during the repairs record the following:

ANALYZER REG. NO. R☐☐☐☐

	HC (PPM)	CO (%)
Initial Reading (As Received)	☐☐☐☐☐	☐☐.☐☐
Final Reading (After Adjustment/Repairs)	☐☐☐☐☐	☐☐.☐☐

NOTE:

If vehicle is 1967 or older model: or if a registered emissions analyzer is used and both HC and CO readings do not exceed maximum allowable on vehicle inspection report: or if vehicle is 1968-1971 reconstructed, only A is required.

Other 1968 and newer models: If test results indicate CO failure only: complete items A & C. If test results indicate HC failure only or both HC and CO failure: complete items A & B.

I HEREBY CERTIFY THAT THE REPAIRS REQUIRED ABOVE WERE PERFORMED ON THIS VEHICLE AND IF THE VEHICLE FAILS REINSPECTION, A WAIVER IS REQUESTED.

NAME: ____________________ ____________________
PRINT SIGNATURE

REPAIR COST LIMITS: Owners of 1967 and earlier models need not spend more than $25 on the repair procedures listed above; for 1968 and later model vehicles, the maximum cost is $75. Exceptions to these repair limits are listed on the back of the yellow supplement.

IMPORTANT

INSPECTORS ARE PROHIBITED BY REGULATION FROM MAKING ANY RECOMMENDATIONS OR ESTIMATES RELATIVE TO REPAIRS.

FOR REPAIR INSTRUCTIONS REFER TO THE INSPECTION REPORT SUPPLEMENT.

FOR REGISTRATION INFORMATION SEE REVERSE SIDE.

HTS 01017-M.V.I.-1 PT

CO FAILURES ONLY: IF YOUR VEHICLE FAILED CARBON MONOXIDE (CO) MAXIMUM ALLOWABLE ONLY AND HAS BEEN REPAIRED BY A FACILITY WITH A REGISTERED EMISSIONS ANALYZER, YOU MAY BYPASS THE FREE RETEST. FILL IN THE INFORMATION ABOVE AND BELOW AND SEND THE ENTIRE REPORT TO THE BUREAU OF VEHICLUAR EMISSIONS INSPECTION, 600 NORTH 40TH STREET, PHOENIX, AZ 85008, OR TO 4040 EAST 29TH STREET, TUCSON, AZ 85711. ENCLOSE $1 (CHECKS PAYABLE TO THE ARIZONA DEPARTMENT OF HEALTH SERVICES). A CERTIFICATE OF WAIVER WILL BE RETURNED TO YOU BY MAIL, WHICH YOU MUST THEN SEND WITH THE REGISTRATION FEES TO THE COUNTY ASSESSOR.

Vehicle Owner ____________________
PLEASE PRINT

Address ____________________

City, State, Zip ____________________

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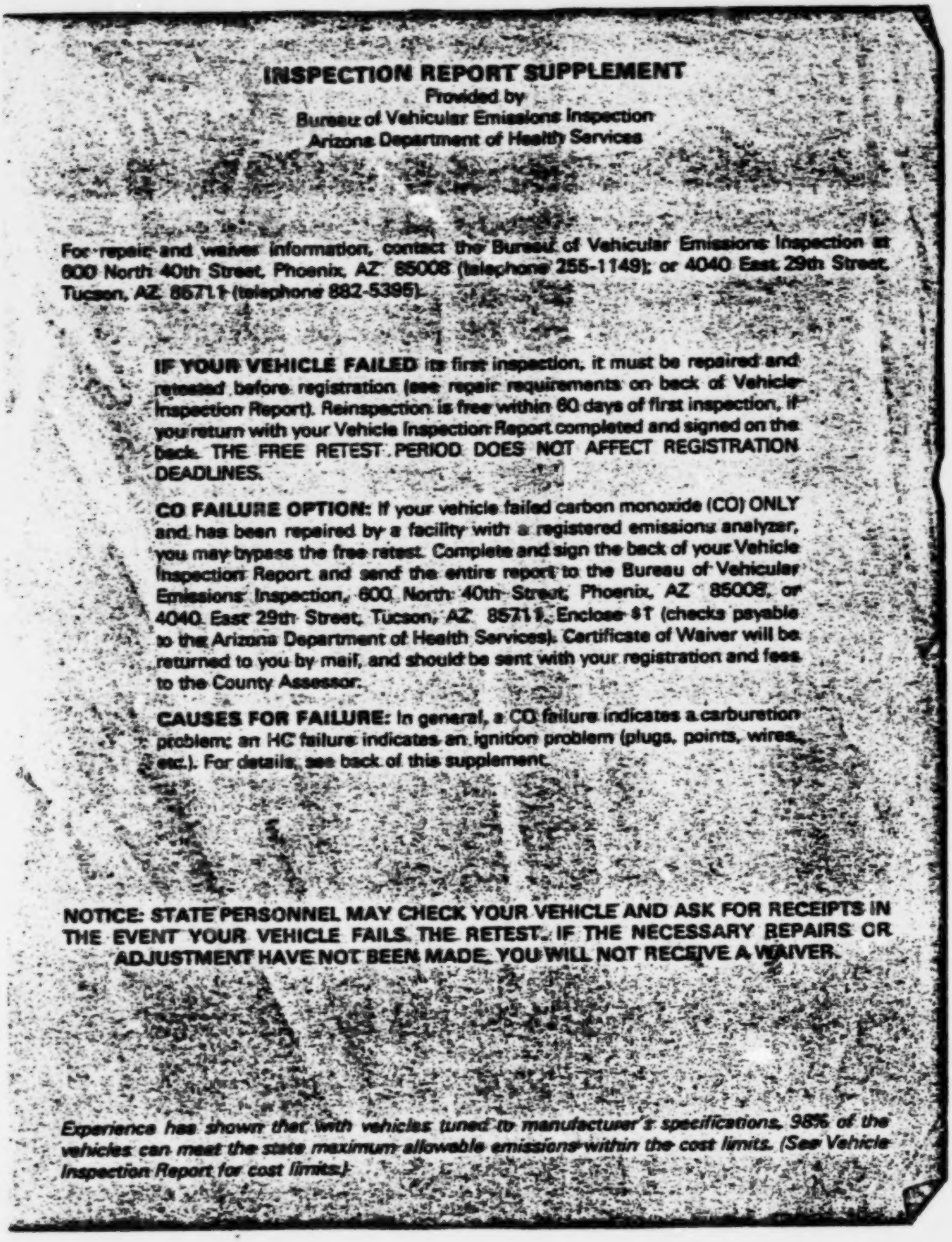

INSPECTION REPORT SUPPLEMENT

Provided by
Bureau of Vehicular Emissions Inspection
Arizona Department of Health Services

For repair and waiver information, contact the Bureau of Vehicular Emissions Inspection at 600 North 40th Street, Phoenix, AZ 85008 (telephone 255-1149); or 4040 East 29th Street, Tucson, AZ 85711 (telephone 882-5395).

IF YOUR VEHICLE FAILED its first inspection, it must be repaired and retested before registration (see repair requirements on back of Vehicle Inspection Report). Reinspection is free within 60 days of first inspection, if you return with your Vehicle Inspection Report completed and signed on the back. THE FREE RETEST PERIOD DOES NOT AFFECT REGISTRATION DEADLINES.

CO FAILURE OPTION: If your vehicle failed carbon monoxide (CO) ONLY and has been repaired by a facility with a registered emissions analyzer, you may bypass the free retest. Complete and sign the back of your Vehicle Inspection Report and send the entire report to the Bureau of Vehicular Emissions Inspection, 600 North 40th Street, Phoenix, AZ 85008, or 4040 East 29th Street, Tucson, AZ 85711. Enclose $1 (checks payable to the Arizona Department of Health Services). Certificate of Waiver will be returned to you by mail, and should be sent with your registration and fees to the County Assessor.

CAUSES FOR FAILURE: In general, a CO failure indicates a carburetion problem; an HC failure indicates an ignition problem (plugs, points, wires, etc.). For details, see back of this supplement.

NOTICE: STATE PERSONNEL MAY CHECK YOUR VEHICLE AND ASK FOR RECEIPTS IN THE EVENT YOUR VEHICLE FAILS THE RETEST. IF THE NECESSARY REPAIRS OR ADJUSTMENT HAVE NOT BEEN MADE, YOU WILL NOT RECEIVE A WAIVER.

Experience has shown that with vehicles tuned to manufacturer's specifications, 98% of the vehicles can meet the state maximum allowable emissions within the cost limits. (See Vehicle Inspection Report for cost limits.)

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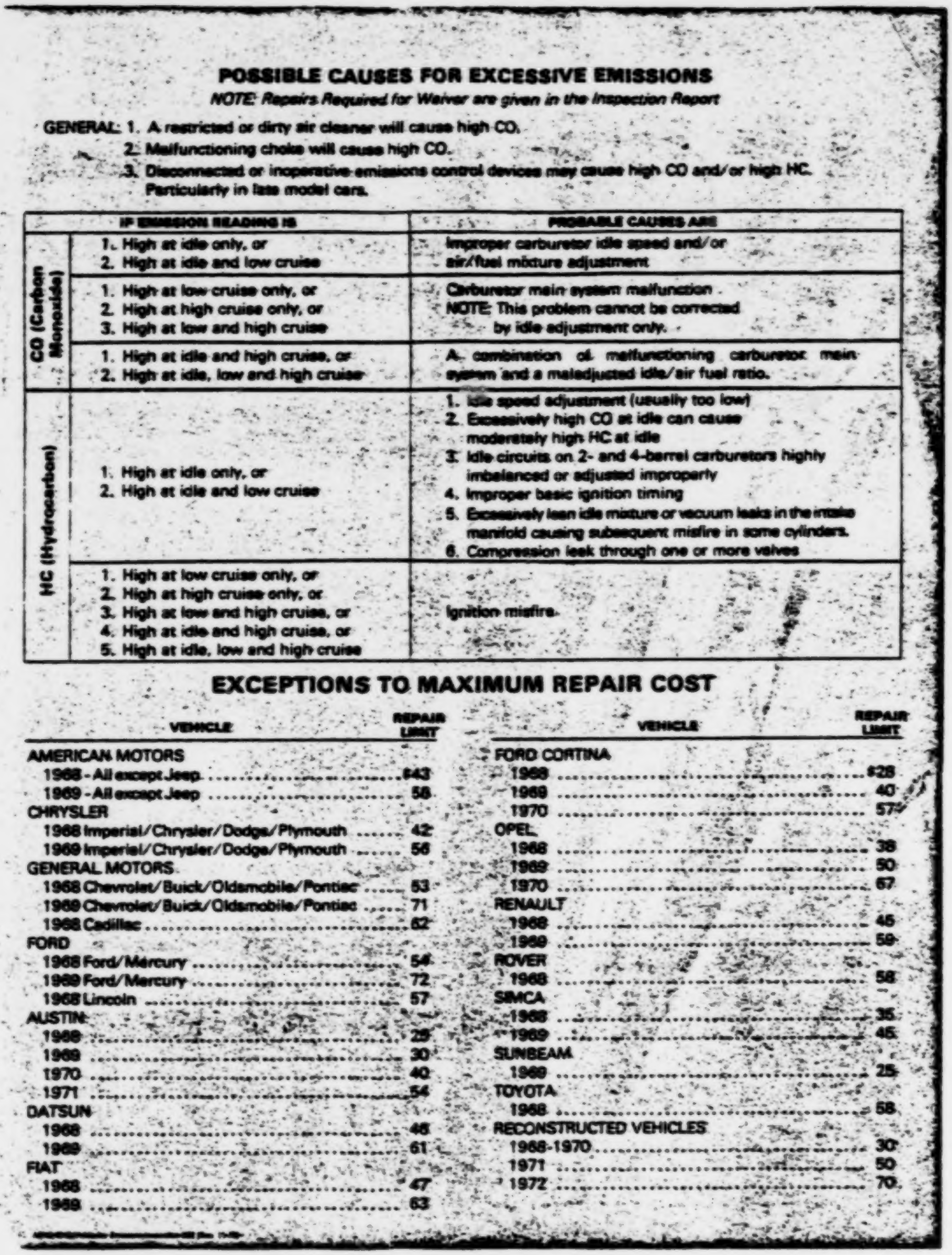
ARIZONA INSPECTION REPORT SUPPLEMENT -- REVERSE



POSSIBLE CAUSES FOR EXCESSIVE EMISSIONS

NOTE: Repairs Required for Waiver are given in the Inspection Report

GENERAL:
1. A restricted or dirty air cleaner will cause high CO.
2. Malfunctioning choke will cause high CO.
3. Disconnected or inoperative emissions control devices may cause high CO and/or high HC. Particularly in late model cars.

	IF EMISSION READING IS	PROBABLE CAUSES ARE
CO (Carbon Monoxide)	1. High at idle only, or 2. High at idle and low cruise	Improper carburetor idle speed and/or air/fuel mixture adjustment
	1. High at low cruise only, or 2. High at high cruise only, or 3. High at low and high cruise	Carburetor main system malfunction. NOTE: This problem cannot be corrected by idle adjustment only.
	1. High at idle and high cruise, or 2. High at idle, low and high cruise	A combination of malfunctioning carburetor main system and a maladjusted idle/air fuel ratio.
HC (Hydrocarbon)	1. High at idle only, or 2. High at idle and low cruise	1. Idle speed adjustment (usually too low) 2. Excessively high CO at idle can cause moderately high HC at idle 3. Idle circuits on 2- and 4-barrel carburetors highly imbalanced or adjusted improperly 4. Improper basic ignition timing 5. Excessively lean idle mixture or vacuum leaks in the intake manifold causing subsequent misfire in some cylinders. 6. Compression leak through one or more valves
	1. High at low cruise only, or 2. High at high cruise only, or 3. High at low and high cruise, or 4. High at idle and high cruise, or 5. High at idle, low and high cruise	Ignition misfire.

EXCEPTIONS TO MAXIMUM REPAIR COST

VEHICLE	REPAIR LIMIT
AMERICAN MOTORS	
1968 - All except Jeep	$43
1969 - All except Jeep	58
CHRYSLER	
1968 Imperial/Chrysler/Dodge/Plymouth	42
1969 Imperial/Chrysler/Dodge/Plymouth	56
GENERAL MOTORS	
1968 Chevrolet/Buick/Oldsmobile/Pontiac	53
1969 Chevrolet/Buick/Oldsmobile/Pontiac	71
1968 Cadillac	62
FORD	
1968 Ford/Mercury	54
1969 Ford/Mercury	72
1968 Lincoln	57
AUSTIN	
1968	29
1969	30
1970	40
1971	54
DATSUN	
1968	46
1969	61
FIAT	
1968	47
1969	63

VEHICLE	REPAIR LIMIT
FORD CORTINA	
1968	$28
1969	40
1970	57
OPEL	
1968	38
1969	50
1970	67
RENAULT	
1968	45
1969	59
ROVER	
1968	58
SIMCA	
1968	35
1969	45
SUNBEAM	
1969	25
TOYOTA	
1968	58
RECONSTRUCTED VEHICLES	
1968-1970	30
1971	50
1972	70

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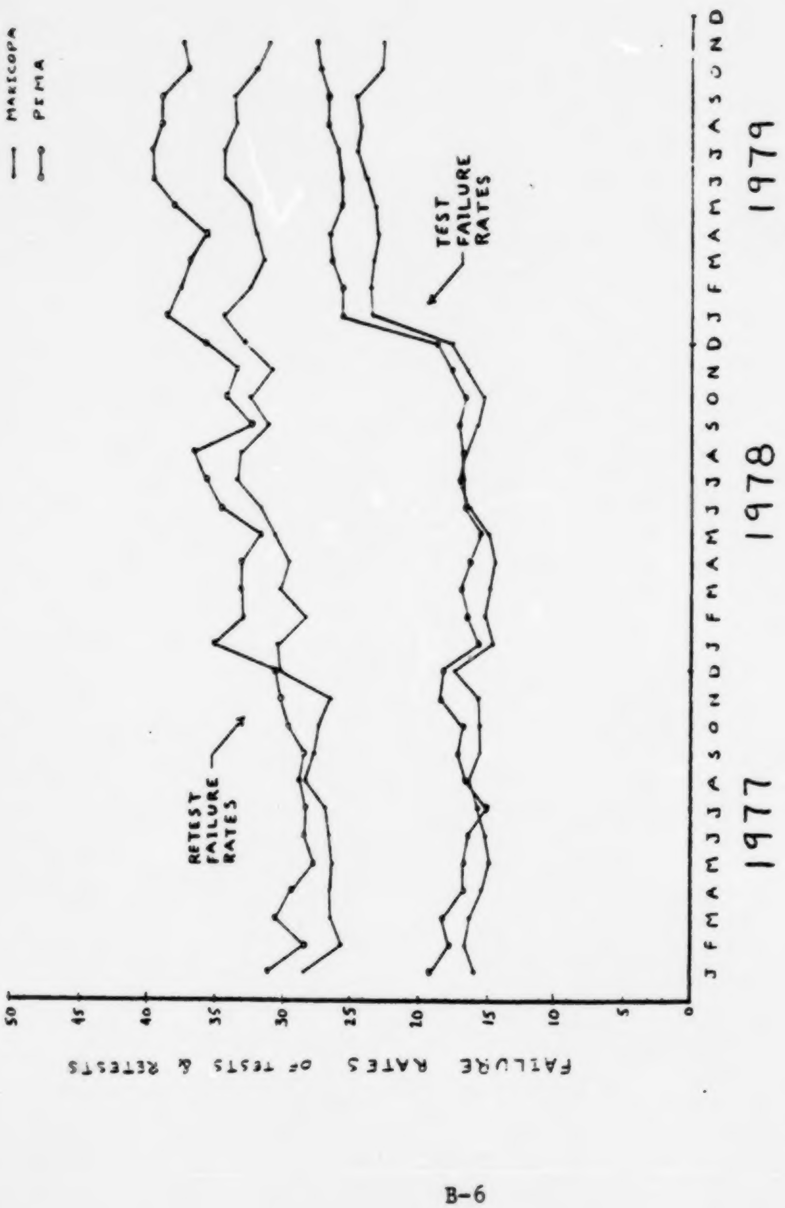
ARIZONA FAILURE RATE SUMMARY



ARIZONA -- VOLUME AND FAILURE RATES FOR EACH LOCATION

NOV
1979

DATE 12/21/79 TIME 0900

VOLUME AND FAILURE RATES FOR EACH LOCATION

LOCATION AND STATION	TOTAL VOLUME	INITIAL TESTS	PAID TESTS INT BYP	PAID TESTS HTS CUS	PAID TESTS NUMBER BILLED	PAID TESTS TOTAL AMOUNT	NON-PAID TESTS FREE RETESTS	NON-PAID TESTS OTHER TESTS	NON-PAID TESTS NUMBER NOT CHARGED	FAILURE RATES TESTS NUMBER	FAILURE RATES TESTS PERCENT	FAILURE RATES RETEST NUMBER	FAILURE RATES RETEST PERCENT
M01	12747	10310	0	1	10311	$48049.26	2339	97	2436	2550	24.73	836	35.74
M02	18185	15194	0	2	15196	$70813.36	2733	256	2989	3149	20.73	754	27.59
M03	9069	7451	0	1	7452	$34726.32	1531	86	1617	1668	22.39	479	31.29
M04	13404	11101	0	0	11101	$51730.66	2206	97	2303	2487	22.40	620	28.11
M05	13772	11361	0	5	11366	$52965.56	2335	71	2406	2526	22.23	685	29.34
M06	9805	7906	1	0	7907	$36846.62	1817	81	1898	2026	25.63	652	35.88
M07	1263	1014	0	0	1014	$4725.24	249	0	249	278	27.42	91	36.55
M08	533	438	0	0	438	$2041.08	95	0	95	114	26.03	26	27.37
MARICOPA	78778	64775	1	9	64785	$301898.10	13305	688	13993	14798	22.85	4143	31.14
P01	7828	6139	0	1	6140	$28612.40	1683	5	1688	1881	30.64	705	41.89
P02	9771	7760	0	0	7760	$36161.60	1991	20	2011	2058	26.52	731	36.72
P03	8107	6476	0	0	6476	$30178.16	1613	18	1631	1725	26.64	530	32.86
P04	265	206	0	1	207	$964.62	58	0	58	64	31.07	31	53.45
PIMA	25971	20581	0	2	20583	$95916.78	5345	43	5388	5728	27.83	1997	37.36
MOBILE	515	373	0	0	373	$1738.18	50	92	142	81	21.72	22	44.00
TOTALS	105264	85729	1	11	85741	$399553.06	18700	823	19523	20607	24.04	6162	32.95

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ARIZONA -- FAILURE RATES AND AVERAGES FOR EACH MODEL YEAR

NOV
1979

DATE 12/21/79 TIME 0900

FAILURE RATES AND AVERAGES FOR EACH MODEL YEAR

VEHICLE MODEL YEAR	INITIAL INSPECTIONS NUMBER TESTED	INITIAL INSPECTIONS NUMBER FAILED	INITIAL INSPECTIONS FAILURE RATE	REINSPECTIONS NUMBER RETESTED	REINSPECTIONS NUMBER FAILED	REINSPECTIONS FAILURE RATE	AVERAGES FOR GASOLINE-FUELED LIGHT DUTY VEHICLES IDLE TEST MODE CO(%)	IDLE TEST MODE HC(PPM)	IDLE TEST MODE NUMBER	LOW CRUISE MODE CO(%)	LOW CRUISE MODE HC(PPM)	LOW CRUISE MODE NUMBER	HIGH CRUISE MODE CO(%)	HIGH CRUISE MODE HC(PPM)	HIGH CRUISE MODE NUMBER
SPECIAL	1201	142	11.82	131	26	19.85	.00	0	0	.00	0	0	.00	0	0
PRE-'61	5	1	20.00	0	0	.00	2.70	208	4	.97	93	3	1.62	170	4
1961	1	0	.00	0	0	.00	4.72	210	1	.00	0	0	4.35	140	1
1962	3	1	33.33	0	0	.00	7.05	180	1	2.55	80	1	2.68	150	1
1963	0	0	.00	0	0	.00	.00	0	0	.00	0	0	.00	0	0
1964	0	0	.00	0	0	.00	.00	0	0	.00	0	0	.00	0	0
1965	5	1	20.00	0	0	.00	2.63	275	2	1.12	180	1	2.16	120	1
1966	2630	760	28.90	690	192	27.83	4.05	392	2426	3.05	260	1802	3.01	271	1915
1967	2871	774	26.96	681	211	30.98	4.04	398	2632	3.18	257	1948	2.91	217	2094
'61-'67	5510	1536	27.88	1371	403	29.39	4.05	395	5062	3.12	258	3752	2.96	243	4012
1968	3492	1128	32.30	1009	396	39.25	3.32	316	3176	2.16	215	2395	2.18	190	2596
1969	4677	1297	27.73	1152	397	34.46	3.25	264	4209	1.76	185	3257	1.95	164	3481
1970	5132	1262	24.59	1140	373	32.72	3.01	249	4639	1.67	167	3797	1.58	150	4006
1971	5653	1321	23.37	1171	378	32.28	2.94	245	5069	1.52	163	4152	1.52	135	4435
'68-'71	18954	5008	26.42	4472	1544	34.53	3.11	264	17093	1.75	179	13601	1.75	156	14518
1972	7849	2201	28.04	1989	746	37.51	2.63	200	6990	1.27	131	6161	1.29	122	6224
1973	8948	2304	25.75	2096	783	37.36	2.55	195	7796	1.42	132	6945	1.34	109	7011
1974	7351	1771	24.09	1587	535	33.71	2.45	164	6438	1.52	128	5731	1.32	117	5828
'72-'74	24148	6276	25.99	5672	2064	36.39	2.55	187	21224	1.40	131	18837	1.32	116	19063
1975	4484	1423	31.74	1301	480	36.89	.96	99	3720	.74	63	3331	.77	60	3396
1976	6958	1865	26.80	1687	589	34.91	.80	88	5788	.55	61	5314	.53	56	5444
1977	8898	2179	24.49	2017	577	28.61	.69	83	7112	.39	57	6572	.49	56	6727
1978	8820	1511	17.13	1424	327	22.96	.55	72	7311	.36	60	6789	.57	67	6969
1979	6716	666	9.92	625	152	24.32	.41	57	5286	.29	48	4900	.34	48	5020
1980	34	0	.00	0	0	.00	.00	14	27	.02	18	26	.20	22	26
1981	1	0	.00	0	0	.00	1.46	100	1	.14	140	1	.14	70	1
POST '74	35911	7644	21.29	7054	2125	30.12	.66	78	29245	.44	58	26933	.53	58	27583
TOTAL	85729	20607	24.04	18700	6162	32.95	2.02	176	72628	1.17	117	63126	1.18	108	65180

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AVERAGE EMISSIONS FOR GASOLINE FUELED VEHICLES IN THE FIRST SIX MONTHS OF 1979 TESTED AT IDLE MODE FOR CARBON MONOXIDE (%) AND HYDROCARBONS (PPM)

Model	Light-Duty Vehicles *			Heavy-Duty Vehicles **			LDVs + HDVs		
Year	CO (%)	HC (PPM)	NUMBER	CO (%)	HC (PPM)	NUMBER	CO (%)	HC (PPM)	NUMBER
1966	4.06	395	17152	4.03	406	962	4.06	396	18,114
1967	4.11	395	18323	4.23	390	1113	4.12	395	19,436
1968	3.38	304	22630	3.64	347	1446	3.40	307	24,076
1969	3.32	269	28866	3.63	326	2237	3.34	273	31,103
1970	3.14	248	31975	3.32	280	2362	3.15	250	34,337
1971	3.03	230	33493	3.19	260	2554	3.03	230	33,493
1972	2.70	196	44967	3.02	230	3827	2.73	199	48,794
1973	2.62	176	48597	2.69	198	5697	2.63	178	54,294
1974	2.49	156	42052	2.73	205	4258	2.51	161	46,310
1975	0.97	90	29200	2.45	178	4600	1.17	102	33,800
1976	0.81	81	39835	2.32	159	7732	1.06	94	47,567
1977	0.71	76	45606	1.91	132	9765	0.92	86	55,371
1978	0.54	62	43316	1.78	120	9896	0.77	73	53,212

* Light-Duty Vehicles = ≤6000 lbs.
** Heavy-Duty Vehicles = >6000 lbs.

AGGREGATED DATA

AGGREGATE	CO (%)	HC (PPM)	NUMBER
66-77	2.43	194	449,249
66-78	2.25	181	502,461
67-78	2.18	173	484,347
66-75	2.85	225	346,311
67-77	2.35		428,976

AVERAGE EMISSIONS FOR GASOLINE FUELED VEHICLES IN 1978 AT IDLE MODE FOR CARBON MONOXIDE (%) AND HYDROCARBONS (PPM)

Model Year	Light-Duty Vehicles			Heavy-Duty Vehicles			LDVs+ HDVs ~~Entire Fleet~~		
	CO(%)	HC (PPM)	NUMBER	CO (%)	HC(PPM)	NUMBER	CO(%)	HC(PPM)	NUMBER
1965	4.79	446	30324	4.60	433	1642	4.78	445	31,966
1966	4.70	423	36538	4.73	421	2129	4.70	423	38,667
1967	4.72	417	39287	4.72	410	2299	4.72	417	41,586
1968	3.84	305	47499	4.24	341	2813	3.86	307	50,317
1969	3.79	271	60672	4.10	304	4436	3.81	273	65,100
1970	3.57	251	65107	3.78	267	4859	3.58	252	69,960
1971	3.42	229	67615	3.75	256	4435	3.44	231	72,550
1972	3.07	193	88619	3.53	221	7788	3.11	195	96,400
1973	2.95	170	94731	3.15	202	11300	2.97	173	106,030
1974	2.75	152	78281	3.15	193	8632	2.79	156	86,913
1975	1.06	82	56156	2.89	176	8654	1.30	95	64,816
1976	0.89	73	73276	2.71	156	13444	1.17	86	86,720
1977	0.83	72	81615	2.21	132	17621	1.08	83	99,230

AGGREGATED DATA

AGGREGATE	CO(%)	HC (PPM)	NUMBER
65-76	3.10 ✓	222 ✓	811,036 ✓
65-77	2.88 ✓	207 ✓	910,272 ✓
66-77	2.81 ✓	198 ✓	878,306 ✓
65-75	3.33 ✓	238 ✓	729,316 ✓ ~~[illegible]~~
66-75	3.27 ✓	229 ✓	692,350 ✓

Validated

AVERAGE EMISSIONS FOR GASOLINE FUELED VEHICLES IN1977 AT IDLE MODE FOR CARBON MONOXIDE (%) AND HYDROCARBONS (PPM)

Model Year	Light-Duty Vehicles CO(%)	HC (PPM)	NUMBER	Heavy-Duty Vehicles CO (%)	HC(PPM)	NUMBER	LDVs & HDVs ~~Entire Fleet~~ CO(%)	HC(PPM)	NUMBER
1964	4.79	449	25438	4.84	444	1473	4.79	449	26,911
1965	4.84	421	35273	4.80	394	1738	4.84	420	37,010
1966	4.72	396	41842	4.83	396	2220	4.73	396	44,060
1967	4.76	396	44792	4.95	376	2338	4.77	395	47,130
1968	3.86	281	53011	4.21	313	2790	3.88	283	55,840
1969	3.81	246	66450	4.18	286	4444	3.83	249	70,890
1970	3.61	229	68761	3.75	240	4793	3.62	230	73,550
1971	3.42	203	69981	3.82	230	4997	3.45	205	74,970
1972	3.01	168	90522	3.56	198	7517	3.05	170	98,030
1973	2.82	146	95945	3.08	168	10077	2.84	148	106,020
1974	2.58	128	77430	3.03	183	7710	2.62	131	85,140
1975	0.91	61	54882	2.82	149	7391	1.14	71	62,270
1976	0.77	57	68693	2.51	132	11295	1.02	68	79,980
1977	0.71	63	19271	2.18	129	4938	1.01	77	24,200

AGGREGATED DATA

AGGREGATE	CO(%)	HC (PPM)	NUMBER
64-75	3.39 ✓	227 ✓	781,815 ✓
64-76	3.17 ✓	212 ✓	861,803 ✓
65-76	3.11 ✓	205 ✓	834,892 ✓
65-75	3.34 ✓	220 ✓	754,904 ✓
66-75	3.26 ✓	210 ~~231~~ ✓	717,893 ✓
65-77	3.05 ✓	201 ✓	859,101

Validated

ARIZONA REPAIR DATA

Type Of Repair Facility	Number Sampled	1978 Percentage Of Industry	Average Cost
Dealers	1233	10.0	$ 41.32
Service Stations	2178	17.7	21.68
Independent Garages	3088	25.1	32.55
Merchandisers	570	4.6	30.63
Tune-up Specialists	621	5.0	33.32
Misc. Repair Facilities	378	3.1	41.29
Individuals & Colleges	140	1.1	48.23
Do-It-Yourselfers	4012	32.6	27.43
Unknown (left blank)	102	.8	28.89
TOTAL POPULATION	12323	100.0	29.99
Uncoded 1978:	2014	14.0	-

Total Count 1978: 14337 Average Cost 1978: $29.99

Total Count 1977: 13184 Average Cost 1977: $28.43

APPENDIX C

LIST OF CALIFORNIA APPENDIX MATERIAL

	PAGE
Data Processing in California's I/M Program	C-2
Vehicle Inspection Report	C-4
Fleet Inspection Checklist	C-6
Fleet Analyzer Accuracy Check	C-7
Contractor Lane Inspection Report	C-8
V.I.P. Inspection Center Report	C-9
Fleet Inspection Report	C-10
Selected Tables from the MVIP Annual Report	C-11
Report on Repair Facilities	C-27
Regional Office Activity Report for the Period of December 3 thru December 28, 1979	C-28
Outline of Low Emission Mechanic Training Program	C-35
Fleet License Application	C-37
Fleet Inspection Form	C-38
Fleet Information Letter	C-39
Vehicle Inspection Program Centers	C-43
Mandatory Vehicle Inspection Area	C-44
Request for Initial Inspection	C-45
Notice for Qualifying Mechanics	C-46

DATA PROCESSING IN CALIFORNIA'S I/M PROGRAM

The prime contractor in California's I/M program is Hamilton Test Systems of Santa Anna, California. Their data collection and manipulation system is organized as follows:

Each of the 17 test centers is equipped with a minicomputer (a PDP 1104, manufactured by Digital). During the daytime testing hours, the minicomputer operates in a testing mode (comparing data produced by the tests to the respective vehicle standards, printing out the test result forms, and storing the data from the tests). At night, the minicomputers are switched to the communications mode and their stored data is transmitted via telephone connection (at 1200 baud) to the district stations.

There are 5 district stations, each of which is responsible for 2 to 5 inspection centers. Each district station is equipped with a PDP 1134 minicomputer that collects and sorts the data transmitted to it from the individual inspection centers. These data are then transmitted to the main office in Santa Anna via telephone (at 1200 baud).

The main office uses a PDP 1170 minicomputer to collect, sort, and transfer the data from all stations onto magnetic tape. Every two weeks these magnetic tapes are mailed to the Bureau of Automotive Repair in Sacramento. The Bureau has two IBM 370/168 computers and an Amdahl V7. These computers perform the analyses on all of the data, using COBOL software for counting tests and tabulating failure rates, and PL/I for analysis and report production. Among the things the PL/I system is capable of doing are:

> Dynamic analysis of failure rates, including comparison of several hypothetical sets of standards with the actual ones to predict potential failure rates.

Plotting graphs of the distribution of emissions measured in the tests.

Calculating the average cost of repairs.

Tabulating the reduction of emissions after repairs.

Scoring the effectiveness of mechanics in the vicinity of each inspection station, e.g., average cost of repairs tabulated by type by shop, conformance score that delineates how well the mechanic conformed with the recommended test procedure.

VEHICLE INSPECTION REPORT

STATE OF CALIFORNIA / C-[redacted]

OFFICIAL VEHICLE INSPECTION CENTER

Your vehicle's test results are shown below. If the Final Result box reads FAIL or REJECT, the ECS Codes, the EMISSION TEST FAILURE Codes, or the REJECT REASON areas of this report give the reason for failure or rejection. An indication of this probable cause of failure can be found on the back of this report. The most common adjustments and repairs likely to be required in order for your vehicle to pass reinspection can be found in the Consumer's Handbook published by the Department of Consumer Affairs. The detailed procedures are contained in the "Qualified" Mechanics Handbook published by the Department of Consumer Affairs.

EMISSION CONTROL SYSTEMS (ECS) FAILURE CODES

FIRST CHARACTER

- A Crankcase Ventilation System
- B Air Injection System
- C Engine Modification
- D Air Preheat / Air Cleaner
- E Ignition Spark Control
- F Exhaust Gas Recirculation
- G Fuel Evaporative System
- H Exhaust Converter
- I Retrofit Exhaust Control
- J Retrofit NOX Control

SECOND CHARACTER

- 1 Modified: Device or System not ARB-approved
- 2 Disconnected/By-passed
- 3 Missing
- 4 Inoperative EGR Valve

EMISSION TEST FAILURE CODES

- 1 Excessive Smoke
- 2 Perform Low Emission Tune-up
- 3 Idle RPM Excessive
- 4 Idle Air/Fuel Mixture Rich
- 5 Misfire at Idle

FINAL RESULTS	ECS FAILURE CODES	EMISSION TEST FAILURE CODE

REJECT REASON

If Final Result is REJECT, the vehicle could not be tested for the following reason(s). Noted condition must be corrected before the vehicle can be tested for certification.

QUEUE NO.	STATION NO.	LANE NO.	TEST MODE	TEST NO.	DATE	TIME

VEHICLE INFORMATION

LICENSE PLATE	VEHICLE IDENTIFICATION NO.	YEAR	MAKE	CYL	WT	MILEAGE	AI/CAT
						,000	

EMISSION INSPECTION INFORMATION

1ST IDLE

	HC (ppm)	CO (%)	OFFICIAL USE ONLY
STATE STANDARD			
EMISSION READINGS			

2500 RPM

	HC (ppm)	CO (%)	OFFICIAL USE ONLY
STATE STANDARD			
EMISSION READINGS			

2ND IDLE

	HC (ppm)	CO (%)	OFFICIAL USE ONLY
STATE STANDARD			
EMISSION READINGS			

IDLE RPM

LIMIT __________

READING __________

FEE [illegible]

AMT. [illegible]

☐ ☐ ECS ☐ EMS ☐ QUAL ☐ CERT ☐ RPM ☐ SMOKE ☐ RETEST ☐

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If the final result box on the front side of this sheet reads "FAIL," the most probable cause of the failure can be found as follows:

1) If there are any ECS Failure Codes shown in the **"ECS Failure Codes"** box, the cause of failure is indicated by the second digit of the code. The **Emission Control System** must be repaired or replaced.

2) If an **Emission Test Failure Code** of "2" is shown, a low-emission tuneup must be performed to the specifications of the Department of Consumer Affairs. This tuneup consists of adjustments of dwell, timing, idle RPM and carburetor air/fuel mixture.

3) Probable causes and recommended repairs for the remaining Emission Inspection Codes are shown in the table below:

CODE	PROBABLE CAUSE OF FAILURE	RECOMMENDED REPAIR *
1	a) Abnormal oil consumption	a) Diagnose and repair cause as required
	b) Worn or broken rings or valve guides	b) Replace broken or worn parts as required
2	See item 2) above	
3	a) Incorrect idle adjustment	a) Adjust to manufacturer's specifications.
	b) Sticking linkage	b) Lubricate, repair or replace linkage.
4	a) Incorrect idle mixture	a) Adjust to manufacturer's specifications
	b) Dirty air filter	b) Replace filter
	c) Choke stuck	c) Repair choke.
	d) Plugged PCV system	d) Repair/replace PCV system.
5	a) Ignition system misfire	a) Diagnose and repair or replace faulty parts.
	b) Lean or unbalanced idle mixture	b) Adjust to manufacturer's specifications.
	c) Vacuum leaks	c) Replace or repair defective parts.
	d) Low compression	d) Diagnose and repair as necessary.

* Refer to Consumer's Handbook on Repair Cost Information

IF YOUR VEHICLE FAILS THE EMISSION INSPECTION, YOU MUST HAVE IT REPAIRED TO PASS RE-INSPECTION OR QUALIFY FOR A WAIVER. IN EITHER CASE, TO QUALIFY FOR RE-INSPECTION, OR BE GRANTED A WAIVER, THIS FORM MUST BE RETURNED TO THE INSPECTION CENTER AND THE REPAIR INFORMATION AND SIGNATURE(S) MUST BE PROVIDED BELOW.

TO BE FILLED OUT BY THE REPAIR FACILITY OR VEHICLE OWNER.

CHECK OFF ITEMS REPAIRED OR REPLACED

MISCELLANEOUS SYSTEMS	REQUIRED	VOLUNTARY	EMISSION CONTROL SYSTEMS	REQUIRED	VOLUNTARY
Low Emission Tuneup	______ 01	______ 02	Crankcase Control	______ 21	______ 22
Carburetor/Fuel Injection	______ 03	______ 04	Air Injection	______ 23	______ 24
Ignition System	______ 05	______ 06	Heated Air Inlet	______ 25	______ 26
Vacuum Leaks (Hoses/Gaskets)	______ 07	______ 08	Ignition Spark Control	______ 27	______ 28
Choke Repair	______ 09	______ 10	Exhaust Gas Recirculation	______ 29	______ 30
Air Filter	______ 11	______ 12	Exhaust Converter	______ 31	______ 32
Idle RPM Adjustment	______ 13	______ 14	Fuel Evaporation	______ 33	______ 34
Other	______ 19	______ 20	Retrofit Device	______ 35	______ 36
			Fuel Restrictor	______ 37	______ 38
PARTS Cost	$______	$______			
LABOR Cost	$______	$______			

After repair/adjustments idle emissions readings: HC______ppm CO______%

MOTORIST OR MECHANIC (AS APPROPRIATE) COMPLETE AND SIGN ONE OF THE FOLLOWING:

MOTORIST REPAIR STATEMENT

I CERTIFY UNDER PENALTY OF PERJURY THAT NO COMPENSATION WAS PAID FOR THE REPAIRS PERFORMED ON THE VEHICLE IDENTIFIED HEREIN.

____
SIGNATURE

____
NAME (PLEASE PRINT)

____
ADDRESS

____
CITY STATE ZIP

QUALIFIED MECHANIC'S REPAIR STATEMENT

TO BE COMPLETED BY A QUALIFIED MECHANIC IN A NON-MVPC REGISTERED REPAIR FACILITY

I CERTIFY THAT THE RECOMMENDED REPAIRS WERE PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS AND PROCEDURES ESTABLISHED BY THE DEPARTMENT OF CONSUMER AFFAIRS, PURSUANT TO SECTION 9889.80 OF THE BUSINESS & PROFESSIONS CODE.

☐☐☐☐☐☐☐☐
ARD REGISTRATION NUMBER

☐☐☐☐☐☐☐☐
QUALIFIED MECHANIC'S NUMBER

____
SIGNATURE

MVPC REPAIR STATEMENT

TO BE COMPLETED BY A QUALIFIED LICENSED MECHANIC (INSTALLER) IN AN MVPC STATION
I CERTIFY THAT:

☐ ALL RECOMMENDED REPAIRS WERE PERFORMED IN ACCORDANCE WITH THE QUALIFIED MECHANICS HANDBOOK.

☐ THIS VEHICLE IS IN NEED OF FURTHER REPAIRS THAT WOULD EXCEED THE COST LIMITATION AND HAS RECEIVED A LOW-EMISSION TUNE-UP.

ADDITIONAL REPAIRS NEED: ______________________

Estimated Cost $ ☐

☐☐☐☐☐☐☐☐
MVPC STATION NUMBER

☐☐☐☐☐☐☐☐
LICENSED INSTALLER'S NUMBER **

____
SIGNATURE

**DO NOT USE QUALIFIED MECHANIC NUMBER

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best available copy.

CALIFORNIA VIP

FLEET INSPECTION CHECKLIST

BUSINESS NAME ______________________________

BUSINESS ADDRESS ______________________________

____

BUSINESS PHONE ( ) ______________________________

MVPC STATION LICENSE NO. ______________________________

CONTACT PERSON ______________________________

FLEET CENTER

___ OWN 10 OR MORE VEHICLES
___ CURRENT ARD (IF APPLICABLE)
___ CURRENT MVPC STATION
___ REQUIRED EQUIPMENT
  - ·BAR APPROVED EXHAUST ANA.
  - ·OSCILLOSCOPE-IGN. ANA.
  - ·AMMETER
  - ·OHMMETER
  - ·VOLTMETER
  - ·TACHOMETER
  - ·VACUUM/PRESSURE GAUGE
  - ·DWELL METER
  - ·IGNITION TIMING LIGHT
  - ·COMPRESSION TESTER
  - ·DISTRIBUTOR ADV. TESTER
  - ·REFERENCE MATERIAL
  - ·HANDBOOKS (VIP & MVPC)

___ ADDEQUATE FACILITIES & PROVIDE ACCESS
___ MAINTAIN RECORDS & FOLLOW REGS.
___ EMPLOY "QUALIFIED" CLASS "A" MECH.
___ PROVIDE TIME FOR TRAINING

FLEET MEMBER

___ OWN 10 OR MORE VEHICLES
___ MUST CONTRACT WITH DEALER FLEET CENTER
___ PROVIDE ACCESS
___ BOTH FLEET CENTER & FLEET MEMBER NEW/USED CAR DEALER

SCHEDULED INSPECTION

DATE ______________

TIME ______________

COMMENTS ______________________________

INSPECTION ASSIGNED TO ______________________________

INSPECTION ASSIGNED BY ______________________________

DATE INSPECTION ASSIGNED ______________________________

FLEET ANALYZER ACCURACY CHECK

BRAND I/R ANALYZER

SERIAL NUMBER

CORRECTION FACTOR

		GAS BOTTLE VALVES		CORRECTED VALUES		VERIFICATION READINGS		SIGNATURE
DATE	TIME	HC	CO	HC	CO	HC	CO	

CALIFORNIA -- CONTRACTOR LANE INSPECTION REPORT

```
                         LANE  INSPECTION  REPORT

 CENTER # . . .   LANE # .   DATE .../.../...   TIME ...:... ..M   INSP ......

 ANALYZERS:   HC/CO-1....     CO2-4....     CO MONITOR-2....     ASST ......
*******************************************************************************
*          FUNCTIONAL CHECKS               *          ACCURACY CHECKS         *
*                                          *                                  *
*  EMISSION DATA ENTRY PANEL.......        *   R P M TACHOMETER:              *
*  TEST CUE PANEL..................        *         ACCURACY..............   *
*  EXHAUST SYSTEM LOUVERS..........        *   C O MONITOR:             ..    *
*  VEHICLE IDENT. TERMINAL.........        *         CONC..................   *
*  CERTIFICATE PRINTER.............        *                                  *
*  V. I. R. PRINTER................        *         READING...............   *
*******************************************************************************
*                                                                             *
*  CALIBRATION GAS SET # . 2      FLOW RATE 8 CFH       HEXANE:PROPANE .....  *
*                                                                             *
*  GAS/CYL. A 7779 ...  A9536...  A14427. MH2152 . 21-8097.. XA9309 ..        *
*                                                                             *
*  CONC.... 100 ......  286 ....  .673.... 907 ... 2045.....  3336 ..         *
*                                                                             *
*  EQUIV CONC ............................................................    *
*                                                                             *
*  READING................................................................    *
*                                                                             *
*  DELTA..................................................................    *
*                                                                             *
*  DELTA %................................................................    *
*                                                                             *
*  STANDARDS. 20%.......................................... 5%....... 5%...   *
*******************************************************************************
*                                                                             *
*  CONC..... 0.50 ... 1.49 .... 2.54 ... 5.70 .. 6.60 .... 8.89 .             *
*                                                                             *
*  READING................................................................    *
*                                                                             *
*  DELTA..................................................................    *
*                                                                             *
*  DELTA %................................................................    *
*                                                                             *
*  STANDARDS. . 20% ..... 20% ..... 8% ..... 5% ..... 5% ...... 5% ..         *
*******************************************************************************
*                                                                             *
*  GAS/CYL... A6333    A3600 .............................................    *
*                                                                             *
*  CONC.       170      506 ..............................................    *
*                                                                             *
*  READING................................................................    *
*                                                                             *
*  DELTA..................................................................    *
*                                                                             *
*  DELTA %................................................................    *
*                                                                             *
*  STANDARDS..............................................................    *
*******************************************************************************
```

LEAK CHECK   MAX INCHES Hg   3 INCH DROP   SECS

V. I. P. INSPECTION CENTER REPORT

DATE . . . / . . . / . . .
INSPECTOR . . . . . .
INSPECTION: SCHEDULED .
TIME . . . : . . . . M
ASSISTANT . . . . .
CALL BACK .
INSPECTION CENTER # . . .
LOCATION: . . . .
NO. LANES INSP. . . . .

APPEARANCE

LANDSCAPING/EXTERNAL. . . . .
PUBLIC AREAS:
HALLS. . . . .
RESTROOMS. . . . .
OFFICE. . . . .
TESTING AREAS. . . . .

QUEUING

OF VEHICLES IN QUEUE . . . . . .
OF VEHICLES IN STREET . . . . . .

QUEUE TIME (MIN) . . . . . .
CUSTOMER TIME (MIN) . . . . . .

PUBLIC INTERFACE

EMPLOYEE APPEARANCE. . . . .
EMPLOYEE COURTESY. . . . .
PAMPHLETS & LITERATURE. . . . . .
REPAIR FACILITY STATISTICS . .

INSPECTION PROCEDURES

POSITION 1 DUTIES. . . . .
POSITION 2 DUTIES. . . . .
POSITION 3 DUTIES. . . . .

PUBLIC SAFETY

SLIPPERY FLOORS. . . . .
STRAY TOOLS, ETC. . . . .
SAFETY SIGNS. . . . .
OTHER HAZARDS. . . . .

EMPLOYEE SAFETY

GAS BOTTLE STORAGE. . . . .
SAFETY DEVICES IN USE. . . . .
EXCESSIVE NOISE. . . . .
OTHER HAZARDS. . . . .

FACILITY EQUIPMENT

VEHICLE MOVER. . . . .
COMPUTER HARDWARE. . . . .
CALIBRATION/SPAN GAS. . . . .

SYSTEM SOFTWARE

APPROVED VERSION. . . . .
MEDIA VERIFICATION. . . . .
MAINTENANCE FILE CHECK. . . . . .

RECORD KEEPING

MAINTENANCE LEDGER. . . . .
CONSOLE PRINTER LOG. . . . .
FORMS CONTROL LOG. . . . .
C. OF N. C. LOG. . . . .
PROCEDURE MANUALS. . . . .

. . . .

. . . .

. . . .

. . . .

STATE INSPECTOR. . . . .
ASSISTED BY H. T. S. . . . .
DATE . . . / . . . / . . .

M.V.I.P. INSPECTION REPORT (Fleets)

FLEET NO.	MVPC NO.	ARD NO.	DATE

FACILITY NAME

ADDRESS	CITY	ZIP

PHONE NO.	NO. OF CERTIFICATES ISSUED PER WEEK

OWNERS NAME OR RESPONSIBLE MANAGING EMPLOYEE (PRINT)

TYPE INSPECTION

☐ INITIAL
☐ FOLLOW UP
☐ PERIODIC

☐ COMMERCIAL FLEET
☐ DEALER FLEET
☐ COLLECTIVE FLEET
☐ QUALIFIED

ANALYZER CALIBRATION INFORMATION

BRAND NAME	MODEL	SERIAL NO.	C3/C6 FACTOR	DATE LAST CALIBRATED

CORRECTED CAL GAS VALUES

HC ________ PPM PROP. x FACTOR ________________ PPM HEX

± 100 PPM ACCEPTABLE RANGE ________ TO ________ PPM

CO BOTTLE VALUE ______________ %

± .4% RANGE ________ TO ________ %

ANALYZER ACCURACY CHECK

METER READINGS			ACCEPTABLE	
HC THRU CAL PORT	________	PPM	☐ YES	☐ NO
HC THRU PROBE	________	PPM	☐ YES	☐ NO
CO THRU CAL PORT	________	%	☐ YES	☐ NO
CO THRU PROBE	________	%	☐ YES	☐ NO

REMARKS I-R ANALYZER ONLY

GENERAL INSPECTION ITEMS	YES	NO		YES	NO
1. OFFICIAL SIGN DISPLAYED			9. RECORD OF NOx STICKER MAINTAINED		
2. CURRENT STA. LIC./ REG POSTED			10. RECORD OF CERT/ WORK ORDERS MAINTAINED		
3. CURRENT EMPLOYED LIC. INST./ADS.			11. REQ. TOOLS & EQUIP. AVAIL. & SERVICEABLE		
4. CURRENT EMP. INST./ ADS. LIC. (s) DISPLAYED			12. BAR BULLETINS, MECH. HANDBOOK CURRENT		
5. PRICES POSTED			13. TUNE UP SPECS. & SERV. DATA CURRENT		
6. INSPECTION PROCEDURES POSTED			14. HAVE RECEIVED FLEET TRAINING		
7. REG. INSPECTION STEPS FOLLOWED			15.		
8. CERTIFICATES ISSUED CORRECTLY			16.		

COMMENTS:

QUALIFIED / CLASS 'A' MECH. QUALIFICATION NO.	CLASS 'A' NO.	QUALIFIED / CLASS 'A' MECH. QUALIFICATION NO.	CLASS 'A' NO.
QUALIFIED / CLASS 'A' MECH QUALIFICATION NO.	CLASS 'A' NO.	QUALIFIED / CLASS 'A' MECH QUALIFICATION NO.	CLASS 'A' NO.
INSPECTOR'S NAME AND I.D. NO.		OWNER /MANAGER	DATE

78M-27 (1/79)

67090-809 10 M 3RP - OSP

CALIFORNIA - SELECTED TABLES FROM THE MVIP ANNUAL REPORT

Table A-2 - Idle Emission Test Standards and Failure Rates for each Vehicle Category for the First 22 Weeks of the Program

Category	Vehicles Inspected	Model-Year	Cylinders	Emission Control System	Standards with Tolerance HC	Standards with Tolerance CO	Emission Failure Rates	Device Failure Rates	Smoke and RPM Failure Rates	Overall Failure Rates
1	34,764	1955-1965	5 or more	-	1200	9.0	21.43%	40.07%	10.43%	55.34%
2	15,663	1966-1970	5 or more	w/AI	450	3.0	42.14%	54.57%	2.71%	70.23%
3	63,217	1966-1970	5 or more	w/o AI	600	7.0	30.95%	46.53%	2.19%	61.53%
4	26,546	1971-1974	5 or more	w/AI	250	2.2	35.80%	22.96%	1.68%	48.48%
5	46,633	1971-1974	5 or more	w/o AI	450	6.0	30.77%	24.39%	1.26%	46.23%
6	15,137	1955-1967	4 or less	-	1650	8.0	26.43%	21.77%	31.76%	60.18%
7	4,846	1968-1970	4 or less	w/AI	500	3.0	40.69%	48.39%	19.67%	71.32%
8	15,468	1968-1970	4 or less	w/o AI	1000	7.0	30.21%	42.11%	17.90%	62.24%
9	13,650	1971-1974	4 or less	w/AI	350	2.25	42.42%	17.63%	11.33%	54.65%
10	40,711	1971-1974	4 or less	w/o AI	500	6.0	28.99%	17.03%	13.40%	45.48%
11	23,870	1975-1979	All	No cat	350	3.0	22.26%	9.70%	3.48%	30.10%
12	19,137	1975-1979	All	Cat w/o AI	250	2.0	34.77%	10.40%	2.41%	41.04%
13	67,124	1975-1979	All	Cat w/AI	250	2.0	10.37%	10.84%	2.78%	20.66%
14	24	1975-1979	All	3-way cat	250	2.0	4.17%	4.17%	4.17%	8.33%
	386,790						27.05%	26.48%	6.50%	46.74%

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Table A-3

Emission Control Device Failures
for Weeks 11 through 22 by Vehicle Category

Category Number	Category Population	Crankcase Ventilation	Heated Air Injection	Engine Modification	Air Cleaner	Ignition Spark	EGR	Fuel Evap.	Catalyst	Retrofit Exhaust	Retrofit NOx	Vehicles Failing
1	18,552	2,577 (13.9%)	-	-	-	-	-	-	-	7,842 (42.3%)	-	8,726 (47.0%)
2	8,608	844 (9.8%)	1,721 (20.0%)	161 (1.9%)	754 (8.8%)	180 (2.1%)	-	30 (0.4%)	-	2 (0.02%)	4,738 (55.0%)	5,465 (63.5%)
3	34,216	2,727 (8.0%)	- -	337 (1.0%)	5,300 (15.5%)	1,784 (5.2%)	-	450 (1.3%)	- -	7 (0.02%)	15,745 (46.0%)	18,463 (54.0%)
4	14,216	621 (4.4%)	833 (5.9%)	99 (0.7%)	1,958 (13.8%)	639 (4.5%)	1,446 (10.2%)	846 (6.0%)	- -	- -	-	4,073 (28.7%)
5	25,244	1,306 (5.2%)	-	179 (0.7%)	4,857 (19.2%)	1,499 (5.9%)	1,304 (5.2%)	1,577 (6.3%)	-	- -	-	7,377 (29.2%)
6	8,421	787 (9.4%)	20 (0.2%)	-	-	-	-	-		142 (1.7%)	1,377 (16.5%)	2,054 (24.4%)
7	2,687	231 (8.6%)	503 (18.7%)	23 (0.9%)	110 (4.1%)	14 (0.5%)	-	64 (2.4%)	-	-	1,252 (46.6%)	1,516 (56.4%)
8	8,186	788 (9.6%)	-	213 (2.6%)	1,653 (20,2%)	47 (0.6%)	-	261 (3.2%)	-	-	3,258 (39.8%)	4,008 (49.0%)
9	7,508	198 (2.6%)	584 (7.8%)	53 (0.7%)	787 (10.5%)	153 (2.0%)	232 (3.1%)	302 (4.0%)	-	-	-	1,634 (21.8%)
10	21,684	825 (3.8%)	-	282 (1.3%)	2,851 (13.2%)	611 (2.8%)	519 (2.4%)	1,284 (5.9%)	-	-	-	4,664 (21.5%)
11	11,935	194 (1.6%)	278 (2.3%)	55 (0.5%)	855 (7.2%)	115 (1.0%)	419 (3.5%)	255 (2.1%)	-	-	-	1,471 (12.3%)
12	10,041	150 (1.5%)	-	10 (0.1%)	466 (4.6%)	92 (0.9%)	628 (6.3%)	150 (1.5%)	313 (3.1%)	-	-	1,378 (13.7%)
13	37,263	573 (1.5%)	610 (1.6%)	40 (0.1%)	2,073 (5.6%)	256 (0.7%)	1,905 (5.1%)	723 (1.9%)	786 (2.1%)	-	-	5,137 (13.8%)
14	15	0 (0%)	0 (0	0 (0%)	0 (0%)	0 (0%)	1 (6.7%)	0 (0%)	0 (0%)	-	-	1 (6.7%)

Table A-4 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the 1976 Riverside Surveillance Study

Category 1 (1955-1965, 5 or more cylinders)

A.	Cut point HC (ppm)/CO(%)		1000/7.0(3)	1050/7.5	1000/8.0	1100/8.5(2)	1200/9.0(1)
B.	Failure Rate of MVIP Centers (%)(4)		36.8	33.0	31.0	26.8	21.3
C.	Average Emission Reduction per Repaired Vehicle (g/mi)(5)	HC	4.08	4.08	4.08	4.23	5.96
		CO	22.84	22.84	22.84	23.31	24.26
		NOx	-0.17	-0.17	-0.17	-0.06	-0.07
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	9.43	8.46	7.95	7.12	7.98
		CO	72.08	64.64	60.72	53.54	44.32
		NOx	-0.68	-0.61	-0.57	-0.19	-0.17
E.	Per Cent Emission Reduction Fleetwide at this Cut Point (%)	HC	10.0	8.9	8.4	7.5	8.4
		CO	8.7	7.8	7.3	6.5	5.3
		NOx	-2.4	-2.2	-2.0	-0.7	-0.6
F.	Average Fuel Consumption Improvement (Gal./1000 Miles)		4.22	4.22	4.22	3.86	3.59
G.	Average Repair Cost per Failed Vehicle ($)		26.95	26.95	26.95	25.29	27.88
H.	Total Weighted Cost per Vehicle ($) (6)		14.90	14.29	13.97	13.22	13.13
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	1.58	1.69	1.76	1.86	1.65
		CO	0.21	0.22	0.23	0.25	0.30
		HC+NOx	1.70	1.82	1.89	1.91	1.68

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum Cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

Table A-5 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the 1976 Riverside Surveillance Study

Category 2 (1966-1970 W/AI, 5 or more cylinders)

A.	Cut Point HC (ppm)/CO(%)		350/2.5(2)	450/3.0(1)(3)	600/3.5	550/4.0	600/4
B.	Failure Rate of MVIP Centers (%)(4)		54.2	41.3	37.6	35.7	34.9
C.	Average Emission Reduction per Repaired Vehicle (g/mi)(5)	HC	8.10	9.4	9.4	9.4	9.4
		CO	21.55	26.01	26.01	26.01	26.01
		NOx	-0.03	-0.13	-0.13	-0.13	-0.13
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	37.10	32.83	29.89	28.38	27.74
		CO	134.65	123.86	112.76	107.06	104.66
		NOx	0.23	-0.82	-0.74	-0.71	-0.69
E.	Per Cent Emission Reduction Fleetwide at this Cut Point	HC	24.9	22.0	20.0	19.0	18.6
		CO	14.6	13.5	12.3	11.7	11.4
		NOx	0.4	-1.5	-1.4	-1.3	-1.3
F.	Average Fuel Consumption Improvement (Gal/1000 Mile)		5.53	6.06	6.06	6.06	6.06
G.	Average Repair Cost per Failed Vehicle ($)		37.94	33.97	33.97	33.97	33.97
H.	Total Weighted Cost per Vehicle ($) (6)		16.85	12.19	11.91	11.76	11.70
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	0.45	0.37	0.40	0.41	0.42
		CO	0.13	0.10	0.11	0.11	0.11
		HC+NOx	0.45	0.38	0.41	0.43	0.43

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 19[illegible] to present

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints

(4) Total exhaust emissions failure rate; may include other types of failures

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

Table A-6 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the 1976 Riverside Surveillance Study

Category 3 (1966-1970 w/o AI, 5 or more cylinders)

A.	Cut Point HC (ppm)/CO(%)		550/6.0	500/6.5(2)(3)	600/6.25	650/6.25	600/7.0(1)
B.	Failure Rate of MVIP Centers (%)(4)		39.6	37.8	36.1	35.7	30.8
C.	Average Emissions Reductions per repaired Vehicle (g/mi)(5)	HC	3.08	3.44	3.24	3.24	3.84
		CO	27.10	28.84	27.80	27.80	29.26
		NOx	.20	0.16	0.13	0.13	0.04
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	10.28	10.50	9.80	10.37	10.0
		CO	123.71	120.03	114.41	121.13	103.90
		NOx	1.20	0.86	0.66	0.70	0.18
E.	Per Cent Emission Reduction Fleet-wide at this Cut Point (%)	HC	9.8	10.0	9.3	9.8	4.5
		CO	11.4	11.0	10.6	11.2	9.6
		NOx	2.6	1.9	1.5	1.6	0.4
F.	Average Fuel Consumption Improvement (Gal/1000 miles)		2.54	2.93	2.89	2.89	2.58
G.	Average Repair Cost per Failed Vehicle ($)		20.26	21.18	20.85	20.85	22.25
H.	Total Weighted Cost per Vehicle ($)(6)		13.93	13.10	13.01	13.24	13.39
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	1.36	1.25	1.33	1.28	1.34
		CO	0.11	0.11	0.11	0.11	0.13
		HC+NOx	1.21	1.15	1.24	1.20	1.31

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present.

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

A23.

Table A-7 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emission and Cost Data from the ARB LDVSP II and III

Category 4 (1971-1974 w/ AI, 5 or more cylinders)

A.	Cut Point HC(ppm)/CO(%)		150/1.75(2)(3)	300/2.0	250/2.25(1)	250/2.5	300/2.5
B.	Failure Rate of MVIP Centers (%)(4)		52.8	43.4	35.1	33.8	33.1
C.	Average Emission Reduction per Repaired Vehicle (g/mi)(5)	HC	2.49	2.7	3.3	3.3	3.3
		CO	26.42	27.07	27.63	27.63	27.63
		NOx	0.37	0.4	0.64	0.64	0.59
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	15.85	14.14	13.97	13.45	13.18
		CO	229.55	193.25	159.53	153.62	150.44
		NOx	4.60	4.09	5.29	5.09	4.60
E.	Per Cent Emission Reduction Fleet-wide at this Cut Point (%)	HC	18.8	16.8	16.6	16.0	15.6
		CO	24.4	20.5	17.0	16.3	16.0
		NOx	7.1	6.3	8.1	7.7	7.1
F.	Average Fuel Consumption Improvement (Gal/1000 miles)		-3.73	-4.48	-5.59	-5.99	-5.99
G.	Average Repair Cost per Failed Vehicles ($)		34.54	39.16	46.37	46.38	46.52
H.	Total Weighted Cost per Vehicle ($)(6)		44.83	42.91	42.97	41.65	37.73
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	2.83	3.05	3.08	3.10	2.86
		CO	0.24	0.25	0.27	0.27	0.25
		HC+NOx	2.19	2.35	2.23	2.25	2.12

(1) Standards and tolerences of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present.

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

Table A-8 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the ARB LDVSP II and III.

Category 5 (1971-1974 w/o AI, 5 or more cylinders)

A.	Cut Point HC(ppm)/CO(%)		350/5.5(2)	400/5.5	450/5.5(3)	450/5.75	450/6.0(1)
B.	Failure Rate of MVIP Centers (%)(4)		38.8	36.7	34.6	32.6	30.4
C.	Average Emission Reduction per Repaired Vehicle (g/mi)(5)	HC	4.68	4.68	4.68	5.30	5.74
		CO	52.08	52.08	52.08	52.95	56.08
		NOx	-0.09	-0.09	-0.09	-0.09	-0.07
D.	Weighted Annual Emission Reduction per Vehicle (lbs/year)	HC	21.90	20.72	19.53	20.84	21.05
		CO	332.39	314.40	296.41	283.34	280.43
		NOx	-0.83	-0.78	-0.74	-0.69	-0.50
E.	Per Cent Emission Reduction Fleet-wide at this Cut Point (%)	HC	19.5	18.5	17.5	18.6	18.8
		CO	40.7	38.5	36.3	34.8	34.4
		NOx	-1.8	-1.7	-1.6	-1.5	-1.0
F.	Average Fuel Consumption Improvement (Gal/1000 miles)		0.93	0.93	0.93	0.54	0.43
G.	Average Repair Cost per Failed Vehicle ($)		22.95	22.95	22.95	23.91	25.62
H.	Total Weighted Cost per Vehicle ($)(6)		20.77	16.89	16.03	17.27	17.49
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	0.95	0.82	0.82	0.83	0.83
		CO	0.06	0.05	0.05	0.06	0.06
		HC+NOx	0.99	0.85	0.85	0.86	0.85

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present.

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

Table A-9 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the 1976 Riverside Surveillance Study

Category 6 (1955-1967, 4 or less cylinders)

A.	Cut Point HC(ppm)/CO(%)		1600/7.5(3)	1650/7.5	1750/7.5(2)	1700/8.0	1850/8.0(1)
B.	Failure Rate of MVIP Centers (%)(4)		35.2	34.1	32.3	29.3	26.7
C.	Average Emission Reduction per Repaired Vehicle (g/mi)(5)	HC	3.05	3.05	3.05	3.05	3.05
		CO	15.92	15.92	15.92	15.92	15.92
		NOx	-0.16	-0.16	-0.16	-0.16	-0.16
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	7.36	7.13	6.78	6.13	5.59
		CO	52.50	50.85	48.18	43.70	39.81
		NOx	-0.70	-0.67	-0.64	-0.58	-0.53
E.	Per Cent Emission Reduction Fleet-wide at this Cut Point (%)	HC	7.2	7.0	6.6	6.0	5.5
		CO	7.7	7.5	7.1	6.4	5.8
		NOx	-3.8	-3.7	-3.5	-3.2	-2.9
F.	Average Fuel Consumption Improvement (Gal/1000 miles)		0.20	0.20	0.20	0.20	0.20
G.	Average Repair Cost per Failed Vehicle ($)		34.11	34.11	34.11	34.11	34.11
H.	Total Weighted Cost per Vehicle ($)(6)		22.64	22.21	21.51	20.35	19.34
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	3.07	3.11	3.18	3.32	3.46
		CO	0.43	0.44	0.45	0.47	0.49
		HC+NOx	3.39	3.44	3.52	3.67	3.92

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present.

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

Table A-10 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the 1976 Riverside Surveillance Study

Category 7 (1968-1970 w/AI 4 or less cylinders)

A.	Cut Point HC (ppm)/CO(%)		400/2.5(2)(3)	300/2.5	500/3.0(1)	450/4.0	550/4.5
B.	Failure Rate of MVIP Centers (%)(4)		47.9	40.9	39.5	35.7	33.0
C.	Average Emission Reduction per Repaired Vehicle (g/mi)(5)	HC	2.33	2.33	2.33	1.32	1.32
		CO	17.22	17.22	17.22	7.89	7.89
		NOx	0.42	0.42	0.42	0.78	0.78
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	9.71	8.29	8.00	4.12	3.81
		CO	98.05	83.72	80.85	33.48	30.94
		NOx	3.06	2.61	2.52	4.26	3.94
E.	Per Cent Emission Reduction Fleet-wide at This Cut Point (%)	HC	17.8	15.2	14.8	7.6	14.0
		CO	12.8	11.0	10.6	4.4	8.2
		NOx	7.0	5.8	5.6	9.6	15.8
F.	Average Fuel Consumption Improvement (Gal/1000 miles)		3.30	3.30	3.30	3.01	3.01
G.	Average Repair Cost per Failed Vehicle		22.15	22.15	22.15	25.56	25.56
H.	Total Weighted Cost per Vehicle ($)		13.72	13.03	12.89	14.30	13.90
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	1.41	1.57	1.61	3.47	3.65
		CO	.14	.16	0.16	0.43	0.45
		HC+NOx	1.07	1.19	1.72	1.71	1.79

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present.

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs; inspection and fuel economy benefits.

Table A-11 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the 1976 Riverside Surveillance Study

Category 8 (1968-1970 W/o AI 4 or less cylinders)

A.	Cut Point HC(ppm)/CO(%)		900/6.5(2)(3)	1050/6.0	900/7.0	950/7.0	1000/7.0(1)
B.	Failure Rate of MVIP Centers (%)(4)		36.7	34.1	32.6	31.5	30.3
C.	Average Emission Reduction per Repaired Vehicle (g/mi)(5)	HC	2.66	2.66	2.66	2.66	2.66
		CO	36.29	36.29	36.29	36.29	36.29
		NOx	-0.17	-0.17	-0.17	-0.17	-0.17
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	8.50	7.90	7.56	7.30	7.03
		CO	158.26	147.02	140.58	135.84	130.66
		NOx	-0.94	-0.87	-0.83	.80	-0.77
E.	Per Cent Emission Reduction Fleet-wide at This Cut Point (%)	HC	10.6	9.8	9.4	9.2	8.8
		CO	16.2	15.0	14.4	13.9	13.4
		NOx	-2.9	-2.7	-2.6	-2.5	-2.4
F.	Average Fuel Consumption Improvement (Gal/1000 miles)		7.48	7.48	7.48	7.48	7.48
G.	Average Repair Cost per Failed Vehicle ($)		32.43	32.43	32.43	32.43	32.43
H.	Total Weighted Cost per Vehicle ($)(6)		8.10	8.17	8.20	8.23	8.26
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	0.95	1.03	1.08	1.13	1.18
			0.05	0.06	0.06	0.06	0.06
		HC+NOx	1.07	1.16	1.22	1.27	1.32

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present.

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

Table A-12 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the ARB LDVSP II and III

Category 9 (1971-1974 W/AI, 4 or less cylinders)

A.	Cut Point HC (ppm)/CO(%)		250/1.75(1)	350/2.25(2)	250/3.0	350/3.0	400/3.5(3)
B.	Failure Rate of MVIP Centers (%)(4)		52.4	41.4	40.3	37.5	34.1
C.	Average Emission Reduction per Repaired Vehicle (g/mi)	HC	1.43	2.15	2.15	2.15	2.89
		CO	4.91	7.7	7.7	7.7	10.16
		NOx	0.38	0.57	0.57	0.57	0.69
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	9.04	10.74	10.45	9.73	11.88
		CO	42.32	52.44	51.04	47.50	56.99
		NOx	4.69	5.56	5.41	5.03	5.54
E.	Per Cent Emission Reduction Fleet-wide at this Cut Point (%)	HC	9.0	10.6	10.3	9.6	11.7
		CO	7.3	9.0	8.8	8.1	9.8
		NOx	9.4	11.2	11.0	10.2	11.2
F.	Average Fuel Consumption Improvement (Gal/1000 miles)		-0.77	-0.43	-0.43	-0.43	-1.17
G.	Average Repair Cost per Failed Vehicle ($)		25.53	33.18	33.44	33.18	37.65
H.	Total Weighted Cost per Vehicle ($)(6)		28.26	26.33	25.87	24.59	26.69
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	3.13	2.45	2.48	2.54	2.25
		CO	0.67	0.50	0.51	0.52	0.47
		HC+NOx	2.06	1.62	1.63	1.67	1.53

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present.

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

Table A-13 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the ARB LDVSP II and III

Category 10 (1971/1974 W/o AI, 4 or less cylinders)

A.	Cut Point HC(ppm)/CO(%)		400/5.5(2)(3)	450/5.5	350/6.0	450/6.0	500/6.0(1)
B.	Failure Rate of MVIP Center (%)(4)		36.1	34.8	34.6	30.3	28.5
C.	Average Emission Reduction per Repaired Vehicle (g/mi)(5)	HC	3.22	2.84	2.90	2.90	2.90
		CO	37.30	34.41	34.31	34.31	34.31
		NOx	-0.27	-0.2	-0.2	-0.2	-0.2
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	14.02	11.92	12.10	10.60	9.97
		CO	221.49	196.97	195.27	171.0	160.85
		NOx	-2.29	-1.64	-1.63	-0.15	-0.13
E.	Per Cent Emission Reduction Fleet-wide at This Cut Point (%)	HC	13.2	11.2	11.4	10.0	9.4
		CO	20.7	18.4	18.3	16.0	15.0
		NOx	-5.48	-3.6	-3.6	-0.3	-0.3
F.	Average Fuel Consumption Improvement (Gal/1000 miles)		0.60	0.51	1/24	1.24	1.24
G.	Average Repair Cost per Failed Vehicle ($)		23.20	21.60	22.70	22.70	22.70
H.	Total Weighted Cost per Vehicle ($)(6)		17.74	17.10	15.55	14.74	14.40
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	1.27	1.43	1.29	1.39	1.44
		CO	0.08	0.09	0.08	0.09	0.09
		HC+NOx	1.51	1.66	1.49	1.41	1.46

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present.

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

Table A-14 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the ARB LDVSP II and III.

Category 11 (1975-1979 No Cat, All cylinders)

A.	Cut Point HC(ppm)/CO(%)		100/2.5(3)	200/2.5	250/2.5(2)	300/3.0	350/3.0(1)
B.	Failure Rate of MVIP Centers (%)(4)		40.9	30.7	28.8	23.5	22.1
C.	Average Emission Reduction per Repaired Vehicle (g/mi)(5)	HC	0.86	0.83	0.86	0.88	0.88
		CO	16.36	15.57	14.51	16.44	16.44
		NOx	0.16	0.16	0.23	0.26	0.26
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	6.10	4.42	4.29	3.59	3.37
		CO	158.22	113.02	98.81	91.35	85.91
		NOx	1.80	1.67	2.24	2.07	1.95
E.	Per Cent Emission Reduction Fleet-wide at This Cut Point (%)	HC	16.0	11.3	11.0	9.1	8.6
		CO	33.8	24.1	21.1	19.5	18.3
		NOx	3.4	3.1	4.1	3.8	3.69
F.	Average Fuel Consumption Improvement (Gal/1000 miles)		-0.34	-0.63	-0.34	-0.56	-0.41
G.	Average Repair Cost per Failed Vehicle ($)		29.20	27.93	29.20	29.44	30.15
H.	Total Weighted Cost per Vehicle ($)(6)		24.66	21.36	20.03	18.25	17.86
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	4.04	4.83	4.67	5.08	5.30
		CO	0.16	0.19	0.20	0.20	0.21
		HC+NOx	3.12	3.51	3.07	3.22	3.35

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present.

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

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Table A-15 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the ARB LDVSP II and III.

Category 12 (1975-1979 Cat. w/o AI, All cylinders)

A.	Cut Point HC (ppm)/CO(%)		150/1.5(2)(3)	200/2.25	200/2.5	250/2.0(1)	300/3.0
B.	Failure Rate of MVIP Centers (%)(4)		46.5	37.3	36.5	34.7	30.4
C.	Average Emission Reduction per Repaired Vehicle (g/mi)(5)	HC	1.01	0.96	0.96	0.97	0.93
		CO	31.53	31.10	31.10	31.37	28.32
		NOx	-0.11	-0.31	-0.31	-0.34	-0.30
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	8.14	6.21	6.08	5.84	4.90
		CO	346.67	274.29	267.53	257.39	203.57
		NOx	-1.73	-3.91	-3.80	-3.99	-3.09
E.	Per Cent Emission Reduction Fleet-wide at This Cut Point (%)	HC	16.9	12.9	12.6	12.1	10.2
		CO	50.7	40.1	39.1	37.6	29.8
		NOx	-3.02	-6.82	-6.7	-7.1	-5.2
F.	Average Fuel Consumption Improvement (Gal/1000 miles)		0.06	0.09	0.09	-0.02	-0.12
G.	Average Repair Cost per failed Vehicle ($)		25.79	22.74	22.74	22.78	22.21
H.	Total Weighted Cost per Vehicle ($)(6)		23.23	19.19	18.97	19.54	17.81
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	2.85	3.09	3.12	3.35	3.63
		CO	0.07	0.07	0.07	0.08	0.09
		HC+NOx	3.62	8.34	8.32	10.50	9.84

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present.

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

Table A-16 - Cost/Effectiveness Analysis at Various Idle HC/CO Cut Points Using the Emissions and Cost Data from the ARB LDVSP II and III.

Category 13 (1975-1979 Cat w/AI, All cylinders)

A.	Cut Point HC(ppm)/CO(%)		100/1.0	100/1.25(3)	150/1.5(2)	250/2.0(1)	300/2.0
B.	Failure Rate of MVIP Centers (%)(4)		25.7	24.2	18	10.2	9.9
C.	Average Emission Reduction per Repaired Vehicle (g/mi)	HC	2.04	2.10	2.32	2.5	2.3
		CO	12.16	12.57	12.24	14.17	14.15
		NOx	0.48	0.50	0.53	0.57	0.59
D.	Weighted Annual Emission Reduction per Inspected Vehicle (lbs/year)	HC	9.08	8.80	7.24	4.63	3.94
		CO	54.19	52.75	38.20	25.85	23.43
		NOx	2.38	2.48	1.86	1.18	1.13
E.	Per Cent Emission Reduction Fleet-wide at This Cut Point (%)	HC	26.2	25.4	20.9	13.4	11.4
		CO	19.8	17.7	12.8	8.7	7.8
		NOx	4.4	4.5	3.4	2.1	2.0
F.	Average Fuel Consumption Improvement (Gal/1000 miles)		2.04	2.33	1.98	2.54	3.19
G.	Average Repair Cost per Failed Vehicle ($)		21.35	20.55	21.63	21.42	22.28
H.	Total Weighted Cost per Vehicle ($)(6)		10.28	9.21	10.04	9.56	8.36
I.	Cost/Effectiveness At Each Cut Point ($/lbs)	HC	1.13	1.05	1.39	2.11	2.12
		CO	0.19	0.17	0.26	0.38	0.34
		HC+NOx	0.90	0.82	1.10	1.65	1.69

(1) Standards and tolerances of 100 ppm HC and 0.5% CO in effect from March 19, 1979 to present.

(2) Standards without tolerances as adopted March 15, 1979.

(3) Optimum cutpoints.

(4) Total exhaust emissions failure rate; may include other types of failures.

(5) Negative sign indicates an increase in pollutants.

(6) Costs include those for repairs, inspection and fuel economy benefits.

Table A-19 - Cost-Effectiveness of Various Pass/Fail Criteria

			Scenario(1) Current Overall[2] Failures With Tolerance	Scenario (2) All Exhaust Standards[1] With Tolerance	Scenario (3) All Exhaust Standards[1] Without Tolerance	Scenario (4) All Exhaust Standards[1] With Tolerance Plus All NOx Device	Scenario (5) Optimized[1] Exhaust Cut-Points	Scenario(6) Optimized Exhaust[1] Cut-Points Plus All NOx Devices
A	Average Annual Emission Reduction per Fleet Vehicle (lb/yr)	HC	10.92	10.43	12.08	10.44	12.29	12.30
		CO	132.77	119.90	150.71	122.28	154.18	156.56
		NOx	1.02	0.53	0.62	1.07	0.64	1.18
B	Per Cent Emission Reduction Fleetwide	HC	11.39	10.89	12.61	10.90	12.83	12.84
		CO	14.94	13.49	16.96	13.76	17.35	17.62
		NOx	2.13	1.12	1.30	2.25	1.34	2.47
C	Overall Failure Rate		44.07	27	35	36.8	36.5	45.7
D	Total Weighted Cost Fleetwide ($)		19.54	16.41	17.86	18.58	17.47	19.64
E	Overall Cost/Effectiveness ($/lb)	HC	1.79	1.57	1.48	1.78	1.42	1.60
		CO	0.15	0.14	0.12	0.15	0.11	0.13
		HC+NOx	1.63	1.49	1.41	1.61	1.35	1.46

[1] Vehicles failing these standards may also have other types of failures.
[2] Overall does not include rpm nor smoke failures because not enough data are available on such failures to permit determination of mass emission reductions.

A34.

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STATE OF CALIFORNIA

DEPARTMENT OF CONSUMER AFFAIRS
BUREAU OF AUTOMOTIVE REPAIR
CALIFORNIA VEHICLE INSPECTION PROGRAM

REPORT IPA003-02 RUN ON 12/18/79

REPAIR FACILITIES NEAR INSPECTION CENTER CC1-GARDEN GROVE

*** REPAIR FACILITY NAME ***	*** CITY ***	*** STREET ADRESS ***	# OF REPAIR ACTIONS	PERCENT PASSING REINSP	PROCED. CONFORM FACTOR	AVE COST
MARTINS AUTO CARE	COSTA MESA	700 W 19TH ST	17	100		$20
IVANS FOREIGN CAR REPAIRS	COSTA MESA	1995 HARBOR BL	1			
SOUTH COAST AUTO COAST CLINIC	COSTA MESA	648 BAKER ST	20	100	.43	$30
SHEEHANS FOREIGN CAR REP INC	COSTA MESA	125 ROCHESTER ST	8	100		$36
BAUER MOTORS	COSTA MESA	P O BOX 1680	5	80		
ADAM SAM W UNION 76	COSTA MESA	560 W 19TH ST	2			
NEWPORT CLASSIC CARS	COSTA MESA	2634 NEWPORT BLVD	1			
GOODWIN AUTOMOTIVE	COSTA MESA	1927 HARBOR BLVD	1			
DAVES UNION 76	CYPRESS	9500 VALLEY VIEW ST	83	100	.30	$28
COLLEGE VOLKSWAGEN INC	CYPRESS	5120 LINCOLN AVE	43	100	.08	$29
LYONS AUTO REPAIR INC	CYPRESS	8980 MOODY ST	26	100	.15	$40
BARBOUR DICK DATSUN	CYPRESS	5800 LINCOLN AVE	25	100	.22	
CYPRESS COLLEGE AUTOMOTIVE	CYPRESS	9200 VALLEY VIEW	1			
BROKEN WHEEL RV CENTER	EAST IRVINE	6441 BURT RD	2			
JOHNS UNION SERVICE	FOUNTAIN VALLEY	9025 GARFIELD AVE	1			
WILSON CLARK SHELL SERVICE	FOUNTAIN VALLEY	17975 MAGNOLIA ST	1			
MELS TEXACO SERVICE	FOUNTAIN VALLEY	8520 WARNER AVE	24	100	.13	$30
HERMANS GULF SERVICE	FOUNTAIN VALLEY	9025 WARNER	15	100	.25	
HART CHEVRON	FOUNTAIN VALLEY	17980 MAGNOLIA	11	82	.40	$17
DILUCCIA BROS CHEVRON	FOUNTAIN VALLEY	10020 WARNER AVENUE	47	100	.22	$30
WITHERS TIRE CO	FOUNTAIN VALLEY	16142 HARBOR BLVD	6	100	.00	
J & L OIL CO	FOUNTAIN VALLEY	11470 EDINGER	27	100	.20	$30
BILLS MOBIL SERVICE	FOUNTAIN VALLEY	17025 BROOKHURST ST	25	100	.05	$45
SHAHIN ARCO SERVICE	FOUNTAIN VALLEY	9520 WARNER AVE	2			
RAY & DAVES TEXACO	FOUNTAIN VALLEY	18975 BROOKHURST ST	1			
LES AUTOMOTIVE	FULLERTON	1018 W ORANGETHORPE AVE	5	80		
SIERRA BODY SHOP	FULLERTON	POBX 2691 ORANGEHURST STA	1			
MC COY-MILLS FORD	FULLERTON	700 W COMMONWEALTH	43	100	.03	
BAUGHMAN & TURNER	FULLERTON	140 E COMMONWEALTH	25	100	.38	$34
RILEYS AUTO SAFETY CENTER	FULLERTON	551 S RAYMOND AVE	1			
JERRY GOODWIN DODGE INC	FULLERTON	1110 W ORANGETHORPE AVE	6	100		
COMMONWEALTH FOREIGN CAR SERVICE	FULLERTON	820 W COMMONWEALTH AVE	6	100		
RENICK CADILLAC INC	FULLERTON	1100 SOUTH EUCLID	1			
FREEKS GARAGE INC	FULLERTON	321 SO HIGHLAND AVE	18	100	.49	
HANSEL OLDSMOBILE INC	FULLERTON	1325 W COMMONWEALTH	16	94	.09	$30
CHET LAMBERT CHEVRON SERVICE	FULLERTON	1000 W ORANGETHORPE	49	98	.14	$29
BASTANCHURY CHEVRON	FULLERTON	2961 E YORBA LINDA BLVD	2			
BENS CHEVRON	FULLERTON	244 E ORANGETHORPE				

State of California **Department of Consumer Affairs**

Memorandum

To : JACK DOLAN

Date : January 8, 1980

File No.:

From : **Bureau of Automotive Repair**
3415 Fletcher Ave., Suite #2, El Monte, CA 91731

Subject: REGIONAL OFFICE ACTIVITY REPORT FOR THE PERIOD OF DECEMBER 3 THRU DECEMBER 28, 1979

The enclosed activity report contains a summary of the Regional Office's activities for the subject period and includes accumulative totals from start up of the VIP fleet program (February 16, 1979).

Following is an executive summary of selected items:

-Total fleets licensed	798
-Total fleet members	331
-Fleet reinspections this period	258
-Total field contacts	380
-Total number of Qualified Mechanics	5,454
-Number of telephone inquiries this period	6,229
-ECS Waiver authorizations issued	1,836
-Total fleet certificate sales	$2,402,395

Please advise if you feel there is a need for additional or more detail reporting in a particular subject area.

John R Wallauch
JOHN R. WALLAUCH
Regional Manager

cc: G. Hunter
B. Wall
B. Mayer
M. Webb
J. Todd
T. Leahy

REGIONAL OFFICE ACTIVITY REPORT

PERIOD OF DECEMBER 3 THRU DECEMBER 28, 1979

I. FLEET LICENSING ACTIVITIES

A. Total fleet applications received to date - - - - - - 941

1. Fleet licensed to date - - - - - - - - - - - 798

   a. new/used car dealers 605 - 34* = 575
   b. used car dealers 176 - 10* = 166
   c. auto repair dealers 3
   d. leasing companies 7
   e. county/state/federal 7
   f. commercial fleets 40

2. Cancelled fleets to date - - - - - - - - - - 44

3. Applications withdrawn - - - - - - - - - - - 24

4. Applications denied - - - - - - - - - - - - 75

5. Applications deferred - - - - - - - - - - - 0

6. Status of Collective Fleets:

   a. Total collective fleet centers: 128
   b. Total collective fleet members: 331

Total Fleet Licenses (fleets & members) - - 1,128

B. Periodic Fleet Inspection Activities

	Report Period	Accum Total
1. Number of inspections conducted:	258	2,201
2. Results of inspections:		
a. No Violations issued:	189	1,707
b. Violations of one or more fleet requirements:	69	470
Summary of Violations:		
1. Required equipment problems(I/R)	50	396
2. No Qualified installer	16	85
3. Fleet licensing criteria	11	29
4. Maintenance of records	12	54
5. Fail to follow procedures	11	63
6. Other	25	71

*Indicates number of fleet licenses cancelled as a result of dealers going out of business, or withdrawing from the Fleet program.

c. Major violations requiring suspension of a fleet's activities. (Violations of Sections 3396.13(b)(1), (2), or (3) and/or 3396.17).

Two licensed fleet operations were suspended during this report period. One fleet operation was suspended due to observed violation of Section 3396.19 (b) b. "Failure to Inspect or Test Vehicles in accordance with Department specifications". The violation was found during random on-site inspection of vehicles certified by the fleet. The second fleet license suspension resulted from administrative action suspending the fleet owners ARD and MVPC licenses for a period of 60 days.

The suspension resulting from violation of Section 3396.19 was a first occurance and the owner has initiated the needed repairs to correct the deficiencies.

	Report Period	Accum Total
d. Other Field Investigations (Initial, Members, SCS Waivers)	122	1,101
e. Random reinspection of fleet certified vehicles	244	1,164
f. Total field contacts	380	4,136

g. Personnel resources usage weekly average:

1. Office staff 3*
2. Field staff 7.9

h. Average daily field contacts per inspector: 2.5

i. Vehicle mileage driven this month: 24,324

NOTE: *One inspector on loan to Complaint Group.

II. MECHANIC'S ORIENTATION SEMINARS AND QUALIFICATION

A. Total Seminar attendance to date - - - - - - 10,323

B. Total persons examined - - - - - - - - - - - - 10,238

C. Total qualification certificates issued - - 5,454

	Pass	Fail
-Class "A" mechanics	3822	2075
percentage	65%	35%
-non Class "A" mechanics	1632	2709
percentage	38%	62%

Overall examination pass percentage - - - - 53%

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D. Number of Seminars offered this report period 4

E. Total Seminars held to date - - - - - - - - - 266

F. Number of schools offering mechanic's qualification training - - - - - - - - - - - - - - 19

-Classes in session or scheduled - - - - - 11

G. Number of mechanics taking re-examination after training, this report period - - - - 2

H. Total mechanics attending classes - - - - - 317

J. Seminar summary by County:

County	Year	Totals
Los Angeles	1978	139
	1979	56
		195
Orange	1978	17
	1979	11
		28
Riverside	1978	8
	1979	3
		11
San Bernardino	1978	5
	1979	1
		6
Ventura	1978	19
	1979	2
		21
Santa Barbara	1978	3
	1979	3
		6
		267

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VII. MOTORIST INQUIRIES AND COMPLAINTS

A. Phone inquiries received to date: 62,344*

B. Phone inquiries received this report period: 6,229

*NOTE: Detail reporting of calls received began with the May Activity Report. The accumulative total is an estimate based upon current recorded data.

Categories		Report Period	Accum Total
1.	HTS Problems	294	2,536
2.	Department of Motor Vehicles	31	374
3.	Qualified Mechanic's List	24	876
4.	Waiver Information	678	4,191
5.	Data Logs - Fleets	4	255
6.	Qualified Mechanic's Procedures	27	376
7.	ECS Application (OEM & Retro)	143	2,417
8.	Engine Changes	134	1,063
9.	General Information	3,003	28,964
10.	Fleet Information & SVIS Calls	62	649
11.	Certifying Heavy-duty trucks	115	751
12.	Non-compliance Questions - new cars	19	202
13.	Non-jurisdictional	6	145
14.	Seminar Information	159	950
15.	MVPC Information	33	314
16.	Idle speed, Standards, $35 Nox Price	38	521
96.	Reference Materials	11	59
97.	A.R.B.	24	122
98.	Calls from Politicians	0	3
99.	Cost of Inspection	401	1,268

C. Average number of calls per day: 327

D. Summary of inquiries and complaints received by phone involving HTS operational problems:

1. Misinspections	OMISSION	CO-MISSION
-Retro-nox	3	5
-Retro exhaust	1	0
-Crankcase	2	0
-Air system	0	7
-Spark Control	4	1
-TAC System	0	3
-EGR System	1	2
-Fuel Evap.	3	1
-Exhaust Catalyst	1	0
-Other ECS Systems	8	2
-After Market Parts	0	0
	23	21

2. Other HTS Complaint Categories	
-Wrong Standards	12
-Repair Facility List Not Handed Out	2
-Unhelpful HTS Personnel	10
-Wrong Info on VIR	5
-Would Not Accept Signed VIR/Would Not Retest	1
-Certified Exempt Vehicles	1
-Waiting Time & HTS (in line)	17
-HTS ECS Lookup Incorrect	1
-Failed Retest for Condition Not Listed on Initial VIR	4
-Tape recorded Info not Turned On	12
-HTS Questions to VIP Staff	2
-Driving Distance Complaint	12
-Directions to HTS Centers	156

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	Report Period	Accum Total	Pending
E. Written Complaints Received:	8	56	10

IV. EMISSION CONTROL WAIVERS

	Report Period	Accum To Date
A. ECS Waiver Authorizations Issued:	325	1,836
B. ECS Waivers Authorized without monies being spent (other than LETU)	4	339

V. QUALITY ASSURANCE

During the month of December, the Quality Assurance teams conducted a total of 57 random unannounced visits to the seventeen Hamilton Test Centers. This activity accounted for the calibration verification check of 151 test lanes and 12 EMS 200 backup analyzers. There were 2 lane failures recorded, wherein the analyzers failed to meet the calibration gas accuracy curve checks on the first try.

After reprograming the EMS with a "cal cal" tape borrowed from Hamilton maintenance, the analyzer passed the calibration accuracy curve check.

Only one cancellation of a random visit occured once this report period due to long queue lines.

The Q.A. Teams visited each HTS center an average of 3 times during this report period.

VI. REPORT OF COLLECTIONS

	Report Period	Accum Total
A. Sale of Fleet Certificates	$204,710	$2,400,272
1. Over the counter	$136,400	$1,673,597
2. Mail Order	$ 68,310	$ 726,675
B. Voluntary Inspection Contribution	$ 60	$ 1,407
C. Qualified Mechanic's & Fleet Handbooks	$ 120	$ 716
Accumulative Grand Total (VIP)	$2,400,392	
D. Sale of MVPC Documents		
1. Certificate of Compliance	$ 700	$ 4,275
2. Certificate of Non-compliance	$ 0	$ 10
3. NOx Stickers	$ 95	$ 495
4. MVPC Handbooks	$ 120	$ 1,694
Accumulative Grand Total (MVPC)	$ 6,474	

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VII. TRAINING

None to report this period.

JOHN R. WALLAUCH
Regional Manager

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CALIFORNIA -- OUTLINE OF LOW EMISSION MECHANIC TRAINING PROGRAM

TRAINING PROGRAM TO QUALIFY MECHANICS FOR LOW EMISSION TUNEUP AND REPAIR

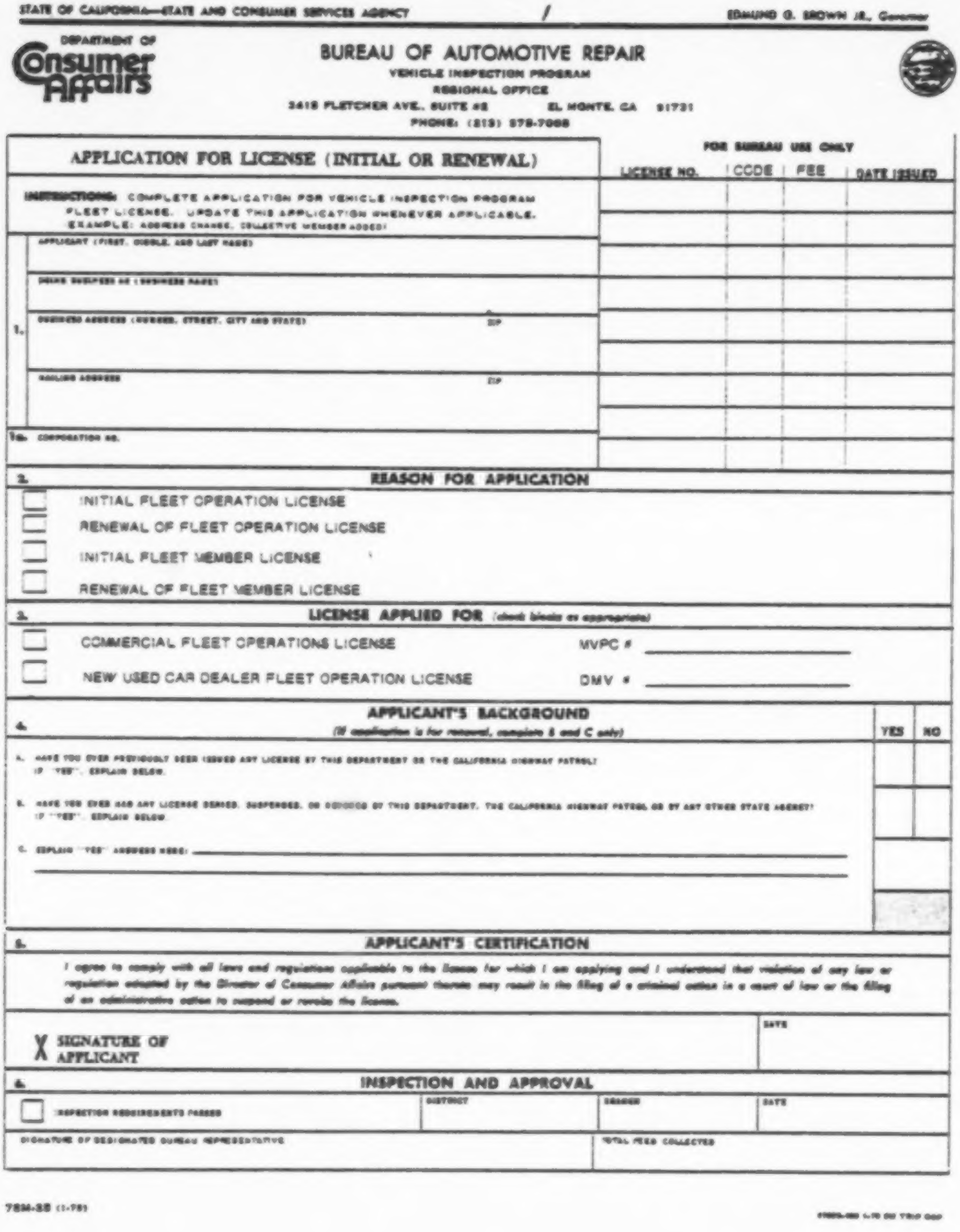
Course Outline	Course Length:	51 Hrs.
Module 1:	Module Hours:	6 Hrs.
1. Introduction to Automotive Emissions Controls		3 Hrs.
2. State Vehicle Inspection Program		3 Hrs.
Module 2:	Module Hours:	12 Hrs.
1. Internal Combustion Engine Theory and Emissions		1 Hr.
2. Fundamentals of Electricity		1.5 Hrs.
3. Conventional and Electronic Ignition Systems		3 Hrs.
	(Demonstration)	1.5 Hrs.
4. Ignition Timing Control Systems		3 Hrs.
	(Demonstration)	2 Hrs.
Module 3:	Module Hours:	21 Hrs.
1. Fuel System, Carburetor Float and Idle Systems		2 Hrs.
	(Demonstration)	1 Hr.
2. Carburetor Main, Power, Pump, Choke Systems and Throttle Controls		2 Hrs.
	(Demonstration)	1 Hr.
3. Evaporative and Crankcase Emissions Control Systems		2 Hrs.
	(Demonstration)	1 Hr.
4. Thermostatic Air Cleaner System		2 Hrs.
	(Demonstration)	1 Hr.

5. Exhaust Gas Recirculation System		2 Hrs.
	(Demonstration)	1 Hr.
6. Air Injection System		2 Hrs.
	(Demonstration)	1 Hr.
7. Catalytic Converter System		2 Hrs.
	(Demonstration)	1 Hr.
	Module Hours:	12 Hrs.
Module 4:		
1. Ignition Analyzer Oscilloscope		1 Hr.
	(Demonstration)	2 Hrs.
2. HC/CO Exhaust Gas Analyzer		1 Hr.
	(Demonstration)	2 Hrs.
3. Failure Diagnosis and Repair Procedures		2 Hrs.
	(Demonstration)	1 Hr.
4. Vehicle Inspection Program Failure and Repair Reports		2 Hrs.
	(Demonstration)	1 Hr.

Course Conclusion

NOTE: The module and section time lengths provided in this outline are to serve as general guidelines. The instructor may wish to modify the hours spent or slides utilized for a particular group of students.

CALIFORNIA -- FLEET LICENSE APPLICATION



STATE OF CALIFORNIA—STATE AND CONSUMER SERVICES AGENCY

EDMUND G. BROWN JR., Governor

DEPARTMENT OF
Consumer Affairs

BUREAU OF AUTOMOTIVE REPAIR

VEHICLE INSPECTION PROGRAM
REGIONAL OFFICE
3419 FLETCHER AVE., SUITE #2 EL MONTE, CA 91731
PHONE: (213) 579-7068

APPLICATION FOR LICENSE (INITIAL OR RENEWAL)

INSTRUCTIONS: COMPLETE APPLICATION FOR VEHICLE INSPECTION PROGRAM FLEET LICENSE. UPDATE THIS APPLICATION WHENEVER APPLICABLE. EXAMPLE: ADDRESS CHANGE, COLLECTIVE MEMBER ADDED)

1\.
APPLICANT (FIRST, MIDDLE, AND LAST NAME)
DOING BUSINESS AS (BUSINESS NAME)
BUSINESS ADDRESS (NUMBER, STREET, CITY AND STATE) ZIP
MAILING ADDRESS ZIP

1a. CORPORATION NO.

FOR BUREAU USE ONLY

LICENSE NO.	CODE	FEE	DATE ISSUED

2. REASON FOR APPLICATION

- ☐ INITIAL FLEET OPERATION LICENSE
- ☐ RENEWAL OF FLEET OPERATION LICENSE
- ☐ INITIAL FLEET MEMBER LICENSE
- ☐ RENEWAL OF FLEET MEMBER LICENSE

3. LICENSE APPLIED FOR *(check blocks as appropriate)*

- ☐ COMMERCIAL FLEET OPERATIONS LICENSE MVPC # __________
- ☐ NEW USED CAR DEALER FLEET OPERATION LICENSE DMV # __________

4. APPLICANT'S BACKGROUND

(If application is for renewal, complete B and C only)

	YES	NO
A. HAVE YOU EVER PREVIOUSLY BEEN ISSUED ANY LICENSE BY THIS DEPARTMENT OR THE CALIFORNIA HIGHWAY PATROL? IF "YES", EXPLAIN BELOW.		
B. HAVE YOU EVER HAD ANY LICENSE DENIED, SUSPENDED, OR REVOKED BY THIS DEPARTMENT, THE CALIFORNIA HIGHWAY PATROL OR BY ANY OTHER STATE AGENCY? IF "YES", EXPLAIN BELOW.		

C. EXPLAIN "YES" ANSWERS HERE: __________

5. APPLICANT'S CERTIFICATION

I agree to comply with all laws and regulations applicable to the license for which I am applying and I understand that violation of any law or regulation adopted by the Director of Consumer Affairs pursuant thereto may result in the filing of a criminal action in a court of law or the filing of an administrative action to suspend or revoke the license.

X SIGNATURE OF APPLICANT

DATE

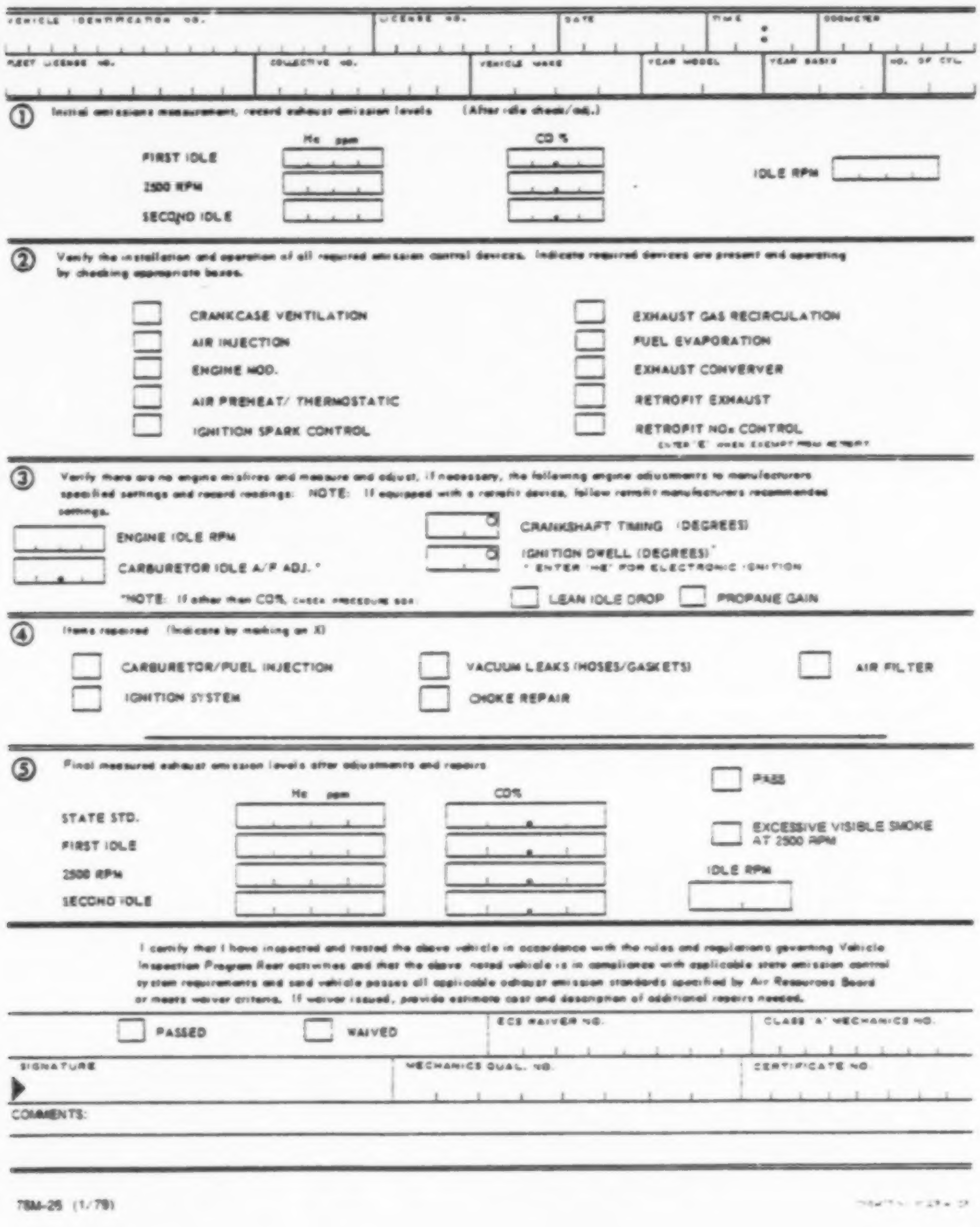
6. INSPECTION AND APPROVAL

☐ INSPECTION REQUIREMENTS PASSED	DISTRICT	BRANCH	DATE
SIGNATURE OF DESIGNATED BUREAU REPRESENTATIVE		TOTAL FEES COLLECTED	

78M-35 (1-78)

[illegible]

CALIFORNIA -- FLEET INSPECTION FORM



VEHICLE CERTIFICATION DATA LOG SHEET

VEHICLE IDENTIFICATION NO. | LICENSE NO. | DATE | TIME : | ODOMETER

FLEET LICENSE NO. | COLLECTIVE NO. | VEHICLE MAKE | YEAR MODEL | YEAR BASIS | NO. OF CYL.

① Initial emissions measurement, record exhaust emission levels (After idle check/adj.)

	Hc ppm	CO %
FIRST IDLE		
2500 RPM		
SECOND IDLE		

IDLE RPM

② Verify the installation and operation of all required emission control devices. Indicate required devices are present and operating by checking appropriate boxes.

☐ CRANKCASE VENTILATION
☐ AIR INJECTION
☐ ENGINE MOD.
☐ AIR PREHEAT/ THERMOSTATIC
☐ IGNITION SPARK CONTROL

☐ EXHAUST GAS RECIRCULATION
☐ FUEL EVAPORATION
☐ EXHAUST CONVERVER
☐ RETROFIT EXHAUST
☐ RETROFIT NOx CONTROL

ENTER 'E' WHEN EXEMPT FROM RETROFIT

③ Verify there are no engine misfires and measure and adjust, if necessary, the following engine adjustments to manufacturers specified settings and record readings: NOTE: If equipped with a retrofit device, follow retrofit manufacturers recommended settings.

ENGINE IDLE RPM
CARBURETOR IDLE A/F ADJ. *

*NOTE: If other than CO%, check procedure [illegible]

CRANKSHAFT TIMING (DEGREES)
IGNITION DWELL (DEGREES)*
* ENTER 'NE' FOR ELECTRONIC IGNITION

☐ LEAN IDLE DROP ☐ PROPANE GAIN

④ Items repaired (Indicate by marking an X)

☐ CARBURETOR/FUEL INJECTION
☐ IGNITION SYSTEM

☐ VACUUM LEAKS (HOSES/GASKETS)
☐ CHOKE REPAIR

☐ AIR FILTER

⑤ Final measured exhaust emission levels after adjustments and repairs

	Hc ppm	CO%
STATE STD.		
FIRST IDLE		
2500 RPM		
SECOND IDLE		

☐ PASS

☐ EXCESSIVE VISIBLE SMOKE AT 2500 RPM

IDLE RPM

I certify that I have inspected and tested the above vehicle in accordance with the rules and regulations governing Vehicle Inspection Program Fleet activities and that the above noted vehicle is in compliance with applicable state emission control system requirements and said vehicle passes all applicable exhaust emission standards specified by Air Resources Board or meets waiver criteria. If waiver issued, provide estimate cost and description of additional repairs needed.

☐ PASSED ☐ WAIVED | ECS WAIVER NO. | CLASS 'A' MECHANICS NO.

SIGNATURE | MECHANICS QUAL. NO. | CERTIFICATE NO.

COMMENTS:

78M-25 (1/79)

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DEPARTMENT OF
Consumer Affairs

VEHICLE INSPECTION PROGRAM

FLEET INFORMATION LETTER

The State of California, on March 19, 1979, initiated a Mandatory Vehicle Inspection Program (MVIP) in the South Coast Air Basin (SCAB) on transfer of registration. There are 17 inspection centers located in the Basin, which includes the counties of Ventura, Orange and portions of Santa Barbara, Los Angeles, Riverside, and San Bernardino Counties (See Attachment I). The inspection centers will be operated by a private contractor (Hamilton Test Systems, California, Inc.) and controlled by the State of California.

The vehicles affected by the new Program are those of 1955 and newer model years, under 8501 GVW, within the Basin. Such vehicles will no longer receive Certificates of Compliance from licensed MVPC ("smog") stations. Instead, they will be inspected at the new State inspection centers. These centers will issue either Certificates of Compliance or Certificates of Waiver. A Certificate is also required when an out-of-state vehicle is first registered in the Basin.

MVIP Fleet Facility License

As an alternative to taking their vehicles through one of the 17 inspection centers, the law permits the Department of Consumer Affairs to license fleets of ten or more vehicles to conduct the inspections and issue Certificates of Compliance or Waiver. These functions are to be performed on the fleet owners own premises utilizing his own facilities or personnel, or both, subject to certain conditions discussed later in this letter. The license will allow the fleet owner to test vehicles owned and operated by the fleet owner or, in the case of a car dealer, to test vehicles in his business inventory on his own premises; and to issue Certificates of Compliance or Waiver.

The Fleet concept provides an opportunity for governmental entities (Federal, State and local governments), public utilities and private business to become licensed as fleets and perform their own inspections subject to State surveillance. It is emphasized that this is an option and those preferring to utilize the State controlled inspection centers, rather than being licensed as fleets, obviously may do so.

A new or used car dealer licensed as an MVIP fleet facility may inspect and test another car dealer's vehicles of 10 or more with prior authorization by the Department. The licensing of car dealers as MVIP fleets will terminate upon implementation of the annual renewal of registration phase of the Program.

Fleet Licensing Requirements

To become licensed as an MVIP fleet facility, the applicant must:

-Be located in the Vehicle Inspection Program area as indicated in Attachment I.

-Own a fleet of 10 or more vehicles affected by the Program (see second paragraph on page one).

-Be registered as an automotive repair dealer, with the Bureau of Automotive Repair, if repairs are performed for compensation.

-Be licensed as an official MVPC station with the Bureau of Automotive Repair.

-Have the required diagnostic and test equipment as follows:

1. Exhaust gas analyzer (dual range) with a 0 to 10% CO and 0-2000 PPM HC as approved by the Bureau of Automotive Repair
2. Oscilloscope - ignition analyzer
3. Ammeter
4. Ohmmeter
5. Voltmeter
6. Tachometer
7. Vacuum/pressure gauge
8. Ignition timing light
9. Cam-angle dwell meter
10. Compression test gauge
11. Distributor advance tester

-Have means of providing weekly gas accuracy check of infra-red analyzer i.e. B.A.R. approved gas bottle or have outside service.

-Have any special testing or diagnostic equipment required by the vehicle or retrofit device manufacturer.

-Have adequate facilities to conduct inspections and tests on his premises in an area approved by the Department.

-Provide whatever access and cooperation the State deems necessary to facilitate random spot checks.

-Employ a mechanic who is a Class "A" MVPC installer and VIP "Qualified". A Class "A" installer may become qualified by attending a VIP seminar and passing the written examination.

-Make available your "Qualified" Class "A" mechanics for a 2½ hour orientation and training course in the inspection and test responsibilities of fleet licensed facilities.

-Purchase and issue Certificates and comply with all Departmental rules, regulations and procedures including maintenance of all required records.

Fleet Member Requirements and Responsibilities of the Inspecting Fleet Facility (Applies to Car Dealers)

A Fleet Member is defined as a car dealer that elects not to meet the requirements to become a licensed fleet facility; elects not to send his cars through one of the 17 State controlled inspection centers; and who is authorized by the State to have his vehicles inspected and certified by another car dealer who is licensed as a fleet facility.

To become a fleet member, a dealer must meet the following requirements:

- Own and operate or have in his business inventory 10 or more vehicles affected by the MVIP.
- Furnish proof that a car dealer licensed as an MVIP fleet facility has agreed to perform the inspection and certification of the fleet member's vehicles.
- Provide whatever access and cooperation the State deems necessary to facilitate random inspections of his car inventory.
- Cannot be a fleet facility without specific Department approval.

Responsibility of the Inspecting Fleet Facility

- The licensed fleet facility that has agreed to perform the inspection must identify in his application for license each fleet member whose vehicles he has agreed to inspect and certify.
- If the inspecting fleet facility determines it will no longer inspect a particular fleet member, the Department shall be notified immediately.
- Specific Departmental approval will be required to add any new fleet member not identified in the approved fleet facility license.
- Five working days time will be required for inspection and approval.
- The licensed fleet facility will be responsible for the proper performance of inspection and certification issued, and disputes between inspecting fleet facilities and fleet members may result in revocation of the Fleet Member's license, the inspecting facility license, or both.
- Inspection and certification for fleet member vehicles must be in compliance with the Department's rules and regulations.
- Certificates are not transferrable.

Certificate Costs

-Each Certificate of Compliance or Waiver costs $11.00. Certificates are sold in books of 10, totaling $110.00.

-Certificates may be purchased from the Regional Office (address provided below) after the fleet applicant's facility has been inspected and the applicant's license approved.

-Certificates will be paid for in the form of cash, certified check, money order, bank draft or check. Payment by check shall be deemed conditional until honored by the bank upon which it is drawn. Certificates will be paid for by the fleet applicant to the Regional Office (address provided below) after the applicant's facility has been inspected by a State representative and the fleet application has been approved.

Applying for a Fleet Facility License

Attachment II is a "Request for Initial Inspection Form".

If you wish to be a licensed MVIP fleet facility, complete the form. You must meet all the requirements listed in this letter under the heading of Fleet Licensing Requirements.

Return the form to the VIP Regional Office at:

Vehicle Inspection Program
Regional Office
3415 Fletcher Avenue
Suite #2
El Monte CA 91731

Telephone: (213) 575-7005

Fleet applicants requesting initial inspections will be contacted by a qualified State representative to schedule their initial inspection.

If you need further information, please write or telephone to the above.

Attachment I - Map of South Coast Air Basin

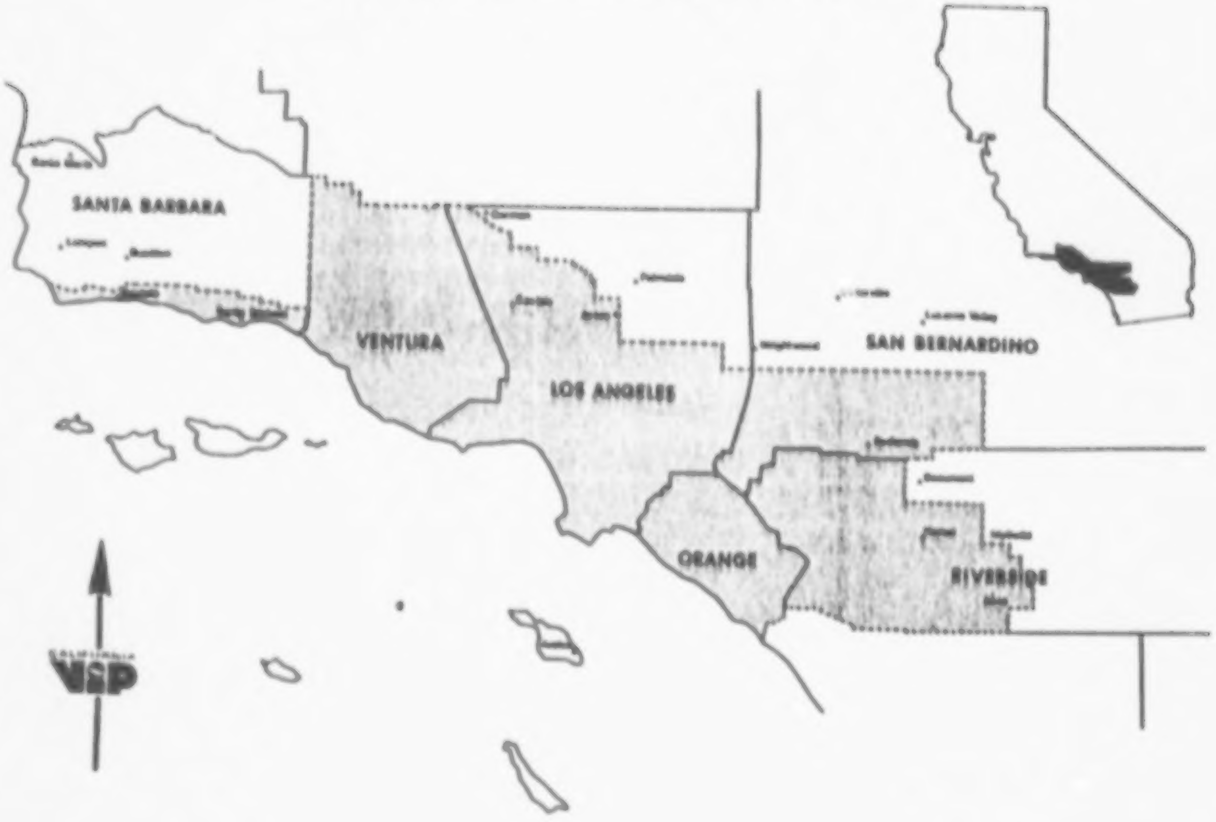
Attachment II - "Request for Initial Inspection Form"

TABLE 1

VEHICLE INSPECTION PROGRAM CENTERS

Station Number	City	Address	Nearest Street Intersection	Phone
CA1	West L. A.	5461 W. Jefferson	Hauser/Jefferson	(213) 930-0245
CA2	(Panarama City) Van Nuys	9933 Woodman	Woodman/Lassen	(213) 891-1125
CA3	Simi Valley	Easy Street	Easy/First Street	(805) 526-1322
CA4	Ventura	2187 Knoll Dr.	Knoll/Valentine	(805) 6[illegible]2-5531
CA5	Goleta	4865 Calle Real	Calle Real/Turnpike	(805) 967-0706
CA6	Newhall	Sand Canyon Rd./Soledad		(805) 251-1596
CB1	(Lincoln Heights) East L. A.	3847 Selig	Selig/Mission	(213) 223-0225
CB2	Rosemead	2649 Stingle Ave.	Stingle/Garvey	(213) 573-4476
CB3	Azusa	805 W. Foothill	Vernon/Foothill	(213) 334-3556
CB4	Cudahy	4959 Patata	Wilcox/Patata	(213) 562-0572
CC1	Garden Grove	7131 Orangewood	Markon/Orangewood	(714) 897-4401
CC2	Carson	230 E. Alondra	Alondra/Main	(213) 538-3465
CC3	Santa Fe Springs	10144 Freeman	Telegraph/Freeman	(213) 944-8633
CC4	Laguna Hills	23022 La Cadena	LaCadena/Verdugo	(714) 837-62[illegible]3
CD1	Riverside	3195 Motor Circle Auto Center		(714) 688-7958
CD2	San Bernardino	222 E. Valley	Valley/Allen	(714) 884-3619
CD3	San Jacinto	State St./7th St.		(714) 654-8231

Mandatory Vehicle Inspection Area


SANTA BARBARA
VENTURA
LOS ANGELES
SAN BERNARDINO
ORANGE
RIVERSIDE
CALIFORNIA
VSP

DEPARTMENT OF
Consumer Affairs

BUREAU OF AUTOMOTIVE REPAIR
VEHICLE INSPECTION PROGRAM
3415 FLETCHER AVE., SUITE #3 EL MONTE, CA 91731
PHONE: (213) 575-7000

• REQUEST FOR INITIAL INSPECTION •

FLEET BUSINESS NAME ____

FLEET BUSINESS ADDRESS ____
NUMBER AND STREET

____
CITY STATE ZIP

FLEET BUSINESS PHONE ( ) ________________________________
AREA CODE

MVIP STATION LICENSE NO. ____

YOUR NAME ____________________ YOUR TITLE ____________________
(PLEASE PRINT) (PLEASE PRINT)

I HAVE REVIEWED THE MVIP FLEET FACILITY REQUIREMENTS CONTAINED IN THE INFORMATION LETTER AND I AM INTERESTED IN BECOMING AN MVIP FLEET FACILITY.

UPON RETURN OF THIS REQUEST, A STATE REPRESENTATIVE WILL CONTACT YOU IN REGARDS TO AN INITIAL INSPECTION OF YOUR FACILITIES.

____
YOUR SIGNATURE DATE

[illegible] (1/78)

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CALIFORNIA -- NOTICE FOR QUALIFYING MECHANICS

STATE OF CALIFORNIA—STATE AND CONSUMER SERVICES AGENCY
EDMUND G. BROWN JR., Governor

DEPARTMENT OF
Consumer Affairs

BUREAU OF AUTOMOTIVE REPAIR
VEHICLE INSPECTION PROGRAM
REGIONAL OFFICE
3415 FLETCHER AVENUE, SUITE #2
EL MONTE, CALIF. 91731
PHONE: (213) 575-7005

CALIFORNIA
VIP

June, 1979

NOTICE TO: MECHANICS INTERESTED IN QUALIFYING TO PERFORM REPAIRS REQUIRED BY THE NEW CALIFORNIA VEHICLE INSPECTION PROGRAM

On March 19, 1979, the State of California, Vehicle Inspection Program (VIP) started testing 1955 and later model year light and medium duty motor vehicles in the counties of Ventura, Orange, Santa Barbara, Los Angeles, Riverside and San Bernardino. The inspection will include measurement of exhaust emissions and an inspection of required emission control systems.

Vehicles will be inspected upon transfer of registration or whenever vehicles from out of state are being registered in California. Vehicles exceeding the States' exhaust emission standards must receive a low emission tune-up and repairs and either pass reinspection or qualify for a waiver.

The law requires that persons performing the necessary low emission repairs on failed vehicles for compensation be qualified by:

1. Attending a VIP orientation seminar
   and
2. Passing the written qualification examination administered at the seminar.

If a mechanic fails the examination at the seminar, he may wish to attend VIP approved training through various educational facilities. He must pass reexamination in the module(s) originally failed.

The orientation seminars will be held throughout the South Coast Air Basin in accordance with the enclosed schedule. Information on the availability of training courses will be disseminated at the seminars. Mechanics who wish to participate in a seminar and the associated qualification examination must complete and return the enclosed self-addressed registration card indicating which of the scheduled seminars he wishes to attend. Facility space and administrative feasibility require that each seminar be limited in size. If there is still space available at the time your application is received, you will be notified that you have been accepted for the seminar you have chosen. If the seminar is filled to capacity, your second choice will be scheduled. Study material will be mailed to mechanics prior to their attending a seminar.

The seminar orientation is scheduled for three hours. During the first hour information on the program will be presented. The remaining two hours of the seminar will be allocated to the mechanics' qualification test.

If you have any questions relative to the program or need to request additional Mechanics' Attendance Cards, please contact:

Vehicle Inspection Program
3415 Fletcher Avenue, Suite 2
El Monte, CA 91731
(213) 575-7005

/BM-8 (Rev. 6/79)

APPENDIX D

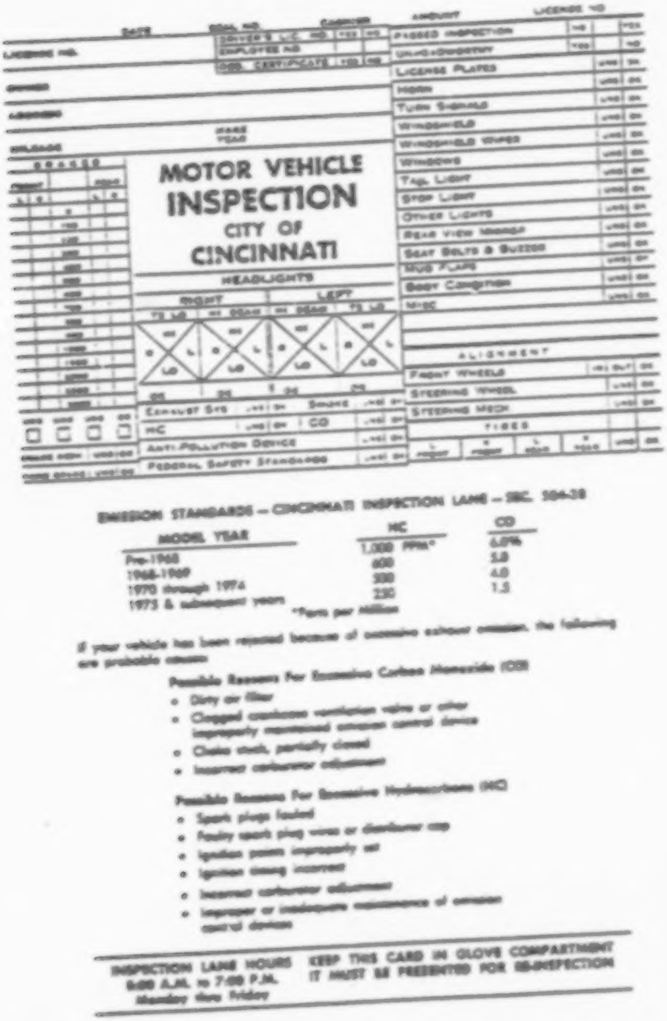
LIST OF CINCINNATI APPENDIX MATERIAL

Page

Inspection Results Reporting Form D-2

Emission Test Program Report D-3

CINCINNATI -- INSPECTION RESULTS REPORTING FORM



DATE
LICENSE NO.
OWNER
ADDRESS
MILEAGE
MAKE
YEAR
DRIVER'S LIC. NO.
EMPLOYEE NO.
AMOUNT
LICENSE NO.

MOTOR VEHICLE INSPECTION
CITY OF CINCINNATI

HEADLIGHTS
RIGHT
LEFT

PASSED INSPECTION	
LICENSE PLATES	
HORN	
TURN SIGNALS	
WINDSHIELD	
WINDSHIELD WIPER	
WINDOWS	
TAIL LIGHT	
STOP LIGHT	
OTHER LIGHTS	
REAR VIEW MIRROR	
SEAT BELTS & BUZZER	
MUD FLAPS	
BODY CONDITION	
MISC	

ALIGNMENT
FRONT WHEELS
STEERING WHEEL
STEERING MECH
TIRES

EXHAUST SYS
SMOKE
HC
CO
ANTI-POLLUTION DEVICE
FEDERAL SAFETY STANDARDS

EMISSION STANDARDS — CINCINNATI INSPECTION LANE — SEC. 504-38

MODEL YEAR	HC	CO
Pre-1968	1,000 PPM*	6.0%
1968-1969	600	5.0
1970 through 1974	300	4.0
1975 & subsequent years	250	1.5

*Parts per Million

If your vehicle has been rejected because of excessive exhaust emission, the following are probable causes:

Possible Reasons For Excessive Carbon Monoxide (CO)

- Dirty air filter
- Clogged crankcase ventilation valve or other improperly maintained emission control device
- Choke stuck, partially closed
- Incorrect carburetor adjustment

Possible Reasons For Excessive Hydrocarbons (HC)

- Spark plugs fouled
- Faulty spark plug wires or distributor cap
- Ignition points improperly set
- Ignition timing incorrect
- Incorrect carburetor adjustment
- Improper or inadequate maintenance of emission control devices

INSPECTION LANE HOURS
8:00 A.M. to 7:00 P.M.
Monday thru Friday

KEEP THIS CARD IN GLOVE COMPARTMENT
IT MUST BE PRESENTED FOR RE-INSPECTION

Cincinnati Inspection Results Reporting Form.

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CINCINNATI -- EMISSION TEST PROGRAM REPORT

AUTOMOBILE EMISSION TEST PROGRAM
Cincinnati and Norwood Stations
1979

Month	Test Days	No. of Cars Tested First Time							Percent of Defective Cars		Police Citations*					Off Days
		1 9 7 9			1978	1977	1976	1975								
		Cinti	Norwood	Total	Total	Total	Total	Total	Cinti	Norw	1979	1978	1977	1976	1975	
Jan	21	4,088	2,590	6,678	5,814	7,446	15,001	25,741	20.8	13.7	673	1,178	1,169	4,817	918	New Year's 1 Mar Lu King 15
Feb	19	3,861	2,952	6,813	11,474	17,746	21,612	18,374	22.2	13.9	547	1,582	3,533	10,356	497	Presidents' Day 19
Mar	22	9,540	5,844	15,384	20,528	24,503	23,213	20,868	20.1	17.3	615	1,163	4,185	6,198	723	None
Apr	21	9,655	6,171	15,826	20,974	21,806	23,800	25,243	16.7	17.6	635	3,835	6,549	7,400	1,219	None
May	22	9,506	6,740	16,246	22,220	21,601	21,464	20,011	19.6	16.8	1,012	3,849	3,477	6,071	912	Memorial Day 28
Jun	21	9,115	5,959	15,074	20,341	22,394	25,904	19,926	22.1	13.1	1,778	3,283	2,982	12,875	1,053	None
Jul	21	8,224	5,148	13,372	15,888	16,091	18,711	11,897	23.5	18.9	1,734	3,199	2,737	7,673	1,126	Independence Day 4
Aug	23	8,097	5,298	13,395	16,261	16,940	19,726	9,520	23.6	16.3	2,325	2,893	2,831	5,578	1,151	None
Sep	19	7,572	4,550	12,122	15,052	14,867	15,963	8,781	21.6	18.6	2,291	3,981	3,384	6,133	2,410	Labor Day 3
Oct	23	7,750	4,665	12,415	14,937	13,702	12,929	8,672	21.3	10.3	1,977	4,425	3,692	4,402	3,011	None
Nov	21	6,328	3,771	10,099	12,157	11,411	12,220	6,905	16.7	8.1	1,506	1,755	2,661	4,342	3,313	Veterans' Day 12 Thanksgiving 22
Dec	19	5,184	2,911	8,095	9,058	8,461	10,690	7,812	18.0	8.8	1,266	2,098	1,575	2,954	3,240	Christmas Eve 24 Christmas 25
TOTALS	252	88,920	56,599	145,519	184,704	196,963	221,233	183,750	20.5	15.0	16,359	33,241	38,775	78,799	19,573	

Defective Cars	Cincinnati	Norwood	Combined
1975	21.5	31.8	25.4
1976	16.9	19.7	18.0
1977	17.0	15.6	16.5
1978	21.4	15.8	19.3
1979 to date	20.5	15.0	18.4

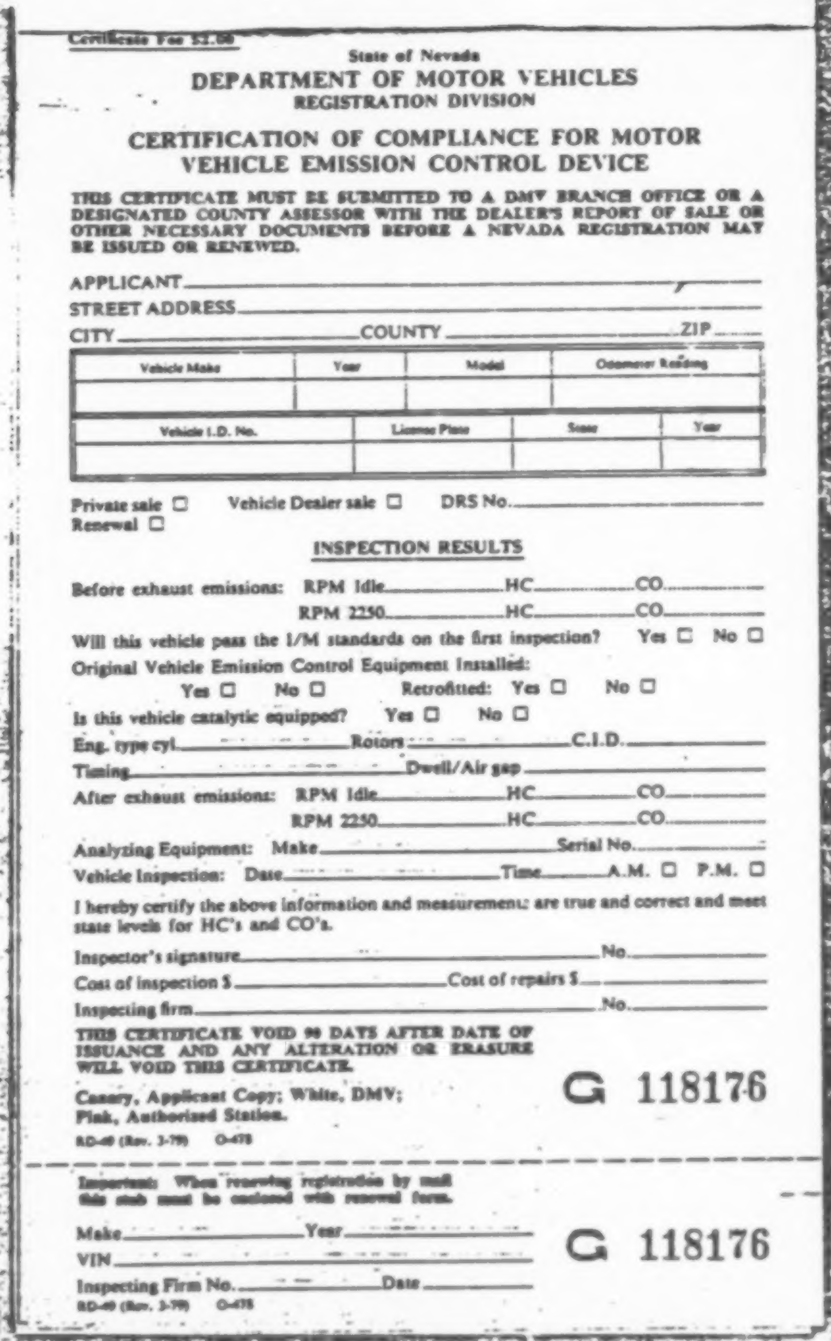
*Cincinnati Police citations only.
Norwood does not separate Inspection Lane citations from total citations.

APPENDIX E

LIST OF NEVADA APPENDIX MATERIAL

	Page
Inspection Form	E-2
Waiver Form	E-3
Emission Level Report	E-4
Vehicles That Passed Inspection Before Adjustment	E-5
Prescribed Inspection Procedures	E-6
Qualifications for an Approved Inspector's License	E-7
Application for "Approved Inspector"	E-8
Exhaust Gas Analyzer Performance Specifications	E-10
Approved Gas Analyzers	E-11
Requirements to Obtain a License as an Authorized Station	E-12
License Station Check List	E-13

NEVADA -- INSPECTION FORM



Certificate Fee $2.00

State of Nevada

DEPARTMENT OF MOTOR VEHICLES

REGISTRATION DIVISION

CERTIFICATION OF COMPLIANCE FOR MOTOR VEHICLE EMISSION CONTROL DEVICE

THIS CERTIFICATE MUST BE SUBMITTED TO A DMV BRANCH OFFICE OR A DESIGNATED COUNTY ASSESSOR WITH THE DEALER'S REPORT OF SALE OR OTHER NECESSARY DOCUMENTS BEFORE A NEVADA REGISTRATION MAY BE ISSUED OR RENEWED.

APPLICANT ____________________

STREET ADDRESS ____________________

CITY __________ COUNTY __________ ZIP _____

Vehicle Make	Year	Model	Odometer Reading

Vehicle I.D. No.	License Plate	State	Year

Private sale ☐ Vehicle Dealer sale ☐ DRS No. __________

Renewal ☐

INSPECTION RESULTS

Before exhaust emissions: RPM Idle _____ HC _____ CO _____

RPM 2250 _____ HC _____ CO _____

Will this vehicle pass the I/M standards on the first inspection? Yes ☐ No ☐

Original Vehicle Emission Control Equipment Installed:

Yes ☐ No ☐ Retrofitted: Yes ☐ No ☐

Is this vehicle catalytic equipped? Yes ☐ No ☐

Eng. type cyl. _____ Rotors _____ C.I.D. _____

Timing _____ Dwell/Air gap _____

After exhaust emissions: RPM Idle _____ HC _____ CO _____

RPM 2250 _____ HC _____ CO _____

Analyzing Equipment: Make _____ Serial No. _____

Vehicle Inspection: Date _____ Time _____ A.M. ☐ P.M. ☐

I hereby certify the above information and measurements are true and correct and meet state levels for HC's and CO's.

Inspector's signature __________ No. _____

Cost of inspection $ _____ Cost of repairs $ _____

Inspecting firm __________ No. _____

THIS CERTIFICATE VOID 90 DAYS AFTER DATE OF ISSUANCE AND ANY ALTERATION OR ERASURE WILL VOID THIS CERTIFICATE.

G 118176

Canary, Applicant Copy; White, DMV; Pink, Authorized Station.

RD-40 (Rev. 3-79) O-478

Important: When renewing registration by mail this stub must be enclosed with renewal form.

Make _____ Year _____

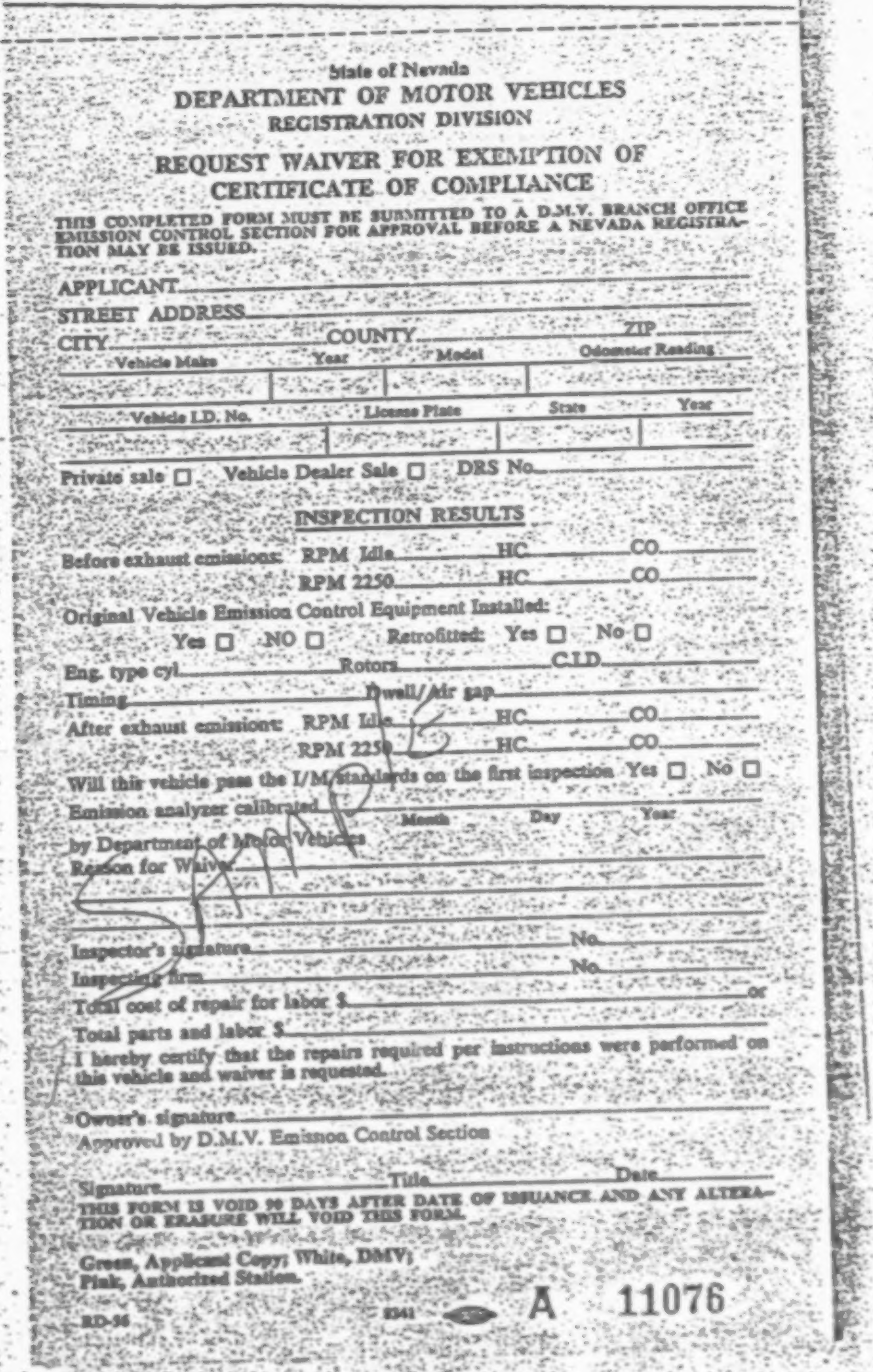
VIN __________

Inspecting Firm No. _____ Date _____

G 118176

RD-40 (Rev. 3-79) O-478

NEVADA -- WAIVER FORM



State of Nevada

DEPARTMENT OF MOTOR VEHICLES

REGISTRATION DIVISION

REQUEST WAIVER FOR EXEMPTION OF CERTIFICATE OF COMPLIANCE

THIS COMPLETED FORM MUST BE SUBMITTED TO A D.M.V. BRANCH OFFICE EMISSION CONTROL SECTION FOR APPROVAL BEFORE A NEVADA REGISTRATION MAY BE ISSUED.

APPLICANT__________

STREET ADDRESS__________

CITY__________ COUNTY__________ ZIP__________

Vehicle Make	Year	Model	Odometer Reading

Vehicle I.D. No.	License Plate	State	Year

Private sale ☐ Vehicle Dealer Sale ☐ DRS No.__________

INSPECTION RESULTS

Before exhaust emissions: RPM Idle__________ HC__________ CO__________

RPM 2250__________ HC__________ CO__________

Original Vehicle Emission Control Equipment Installed:

Yes ☐ NO ☐ Retrofitted: Yes ☐ No ☐

Eng. type cyl__________ Rotors__________ C.I.D.__________

Timing__________ Dwell/Air gap__________

After exhaust emissions: RPM Idle__________ HC__________ CO__________

RPM 2250__________ HC__________ CO__________

Will this vehicle pass the I/M standards on the first inspection Yes ☐ No ☐

Emission analyzer calibrated__________ Month Day Year

by Department of Motor Vehicles

Reason for Waiver__________

SAMPLE

Inspector's signature__________ No.__________

Inspecting firm__________ No.__________

Total cost of repair for labor $__________ or

Total parts and labor $__________

I hereby certify that the repairs required per instructions were performed on this vehicle and waiver is requested.

Owner's signature__________

Approved by D.M.V. Emission Control Section

Signature__________ Title__________ Date__________

THIS FORM IS VOID 90 DAYS AFTER DATE OF ISSUANCE AND ANY ALTERATION OR ERASURE WILL VOID THIS FORM.

Green, Applicant Copy; White, DMV;
Pink, Authorized Station.

RD-56 8341 A 11076

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NEVADA -- EMISSION LEVELS OF ALL VEHICLES

Total # of vehicles

No waiver info.

```
PROGRAM 1610                              STATE OF NEVADA                                                   PAGE 137
EPORT DATE 12/11/78             DEPARTMENT OF MOTOR VEHICLES
                                      REGISTRATION DIVISION                         STATE
                                    EMISSION CONTROL SECTION                        WIDE
        ALL VEHICLES
                                  EMISSION CONTROL STATISTICS

 VEHICLES     ********** BEFORE **********     ********** AFTER **********      AVERAGE REDUCTION
 THRU 1967    **** IDLE ****  **** 2250 ****   **** IDLE ****  **** 2250 ****   **** IDLE ****      **** 2250 ****
                H.C.   C.O.     H.C.   C.O.      H.C.   C.O.     H.C.   C.O.      H.C.      C.O.       H.C.     C.O.
  8,851
 VEHICLES       552    453      403    339       404    308      306    275      148 27%   145 32%    97 24%   64 19%
                 * AVERAGE COST OF INSPECTION $   13.23          AVERAGE COST OF REPAIRS $    1.00

 VEHICLES     ********** BEFORE **********     ********** AFTER **********      AVERAGE REDUCTION
 1968 - 1969  **** IDLE ****  **** 2250 ****   **** IDLE ****  **** 2250 ****   **** IDLE ****      **** 2250 ****
                H.C.   C.O.     H.C.   C.O.      H.C.   C.O.     H.C.   C.O.      H.C.      C.O.       H.C.     C.O.
  7,426
 VEHICLES       389    392      288    259       250    245      196    192      139 36%   147 38%    92 32%   67 26%
                 * AVERAGE COST OF INSPECTION $   13.24          AVERAGE COST OF REPAIRS $    1.22

 VEHICLES     ********** BEFORE **********     ********** AFTER **********      AVERAGE REDUCTION
 1970 - 1974  **** IDLE ****  **** 2250 ****   **** IDLE ****  **** 2250 ****   **** IDLE ****      **** 2250 ****
                H.C.   C.O.     H.C.   C.O.      H.C.   C.O.     H.C.   C.O.      H.C.      C.O.       H.C.     C.O.
  24,627
 VEHICLES       283    328      192    196       180    196      125    137      103 36%   132 40%    67 35%   59 30%
                 * AVERAGE COST OF INSPECTION $   13.63          AVERAGE COST OF REPAIRS $    1.32

 VEHICLES     ********** BEFORE **********     ********** AFTER **********      AVERAGE REDUCTION
 1975 ONWARD  **** IDLE ****  **** 2250 ****   **** IDLE ****  **** 2250 ****   **** IDLE ****      **** 2250 ****
                H.C.   C.O.     H.C.   C.O.      H.C.   C.O.     H.C.   C.O.      H.C.      C.O.       H.C.     C.O.
  17,543
 VEHICLES       167    174       96     90       113     96       69     59       54 32%    78 45%    27 28%   31 34%
                 * AVERAGE COST OF INSPECTION $   14.53          AVERAGE COST OF REPAIRS $     .51

 VEHICLES     ********** BEFORE **********     ********** AFTER **********      AVERAGE REDUCTION
 ALL YEARS    **** IDLE ****  **** 2250 ****   **** IDLE ****  **** 2250 ****   **** IDLE ****      **** 2250 ****
                H.C.   C.O.     H.C.   C.O.      H.C.   C.O.     H.C.   C.O.      H.C.      C.O.       H.C.     C.O.
  58,047
 VEHICLES       301    308      206    193       202    188      144    141       99 33%   120 39%    62 30%   52 27%
                 * AVERAGE COST OF INSPECTION $   13.79          AVERAGE COST OF REPAIRS $    1.02

 NOTE: AVERAGE COST OF INSPECTION INCLUDES $2.00 CE[illegible]ATE FEE
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NEVADA -- EMISSION LEVELS OF VEHICLES THAT PASSED INSPECTION BEFORE ADJUSTMENT

PASSED ON 1st INSPECTION BEFORE ADJUSTMENT

```
                                           S T A T E   O F   N E V A D A                                      PAGE 119
PROGRAM 1910                      D E P A R T M E N T   O F   M O T O R   V E H I C L E S
REPORT DATE 12/14/78                               REGISTRATION DIVISION                        STATE
                                                   EMISSION CONTROL SECTION                     WIDE
       ALL VEHICLES                               EMISSION CONTROL STATISTICS

VEHICLES       ********** B E F O R E **********      ********** A F T E R **********      A V E R A G E   R E D U C T I O N
THRU 1967      **** IDLE ****     **** 2250 ****      **** IDLE ****    **** 2250 ****     **** IDLE ****     **** 2250 ****
                H.C.     C.O.       H.C.    C.O.        H.C.    C.O.      H.C.    C.O.       H.C.     C.O.      H.C.     C.O.
  6,476
VEHICLES        429      351        314     281         375     294       280     254        54 13%   57 16%    34 11%   27 10%
               * AVERAGE COST OF INSPECTION $     13.20                 AVERAGE COST OF REPAIRS $     .54

VEHICLES       ********** B E F O R E **********      ********** A F T E R **********      A V E R A G E   R E D U C T I O N
1968 - 1969    **** IDLE ****     **** 2250 ****      **** IDLE ****    **** 2250 ****     **** IDLE ****     **** 2250 ****
                H.C.     C.O.       H.C.    C.O.        H.C.    C.O.      H.C.    C.O.       H.C.     C.O.      H.C.     C.O.
  4,692
VEHICLES        255      258        188     188         230     226       177     173        25 10%   32 12%    11 6%    15 8%
               * AVERAGE COST OF INSPECTION $     13.23                 AVERAGE COST OF REPAIRS $     .57

VEHICLES       ********** B E F O R E **********      ********** A F T E R **********      A V E R A G E   R E D U C T I O N
1970 - 1974    **** IDLE ****     **** 2250 ****      **** IDLE ****    **** 2250 ****     **** IDLE ****     **** 2250 ****
                H.C.     C.O.       H.C.    C.O.        H.C.    C.O.      H.C.    C.O.       H.C.     C.O.      H.C.     C.O.
  15,901
VEHICLES        174      199        118     132         159     178       109     122        15 9%    21 11%    9 8%     10 8%
               * AVERAGE COST OF INSPECTION $     13.65                 AVERAGE COST OF REPAIRS $     .54

VEHICLES       ********** B E F O R E **********      ********** A F T E R **********      A V E R A G E   R E D U C T I O N
1975 ONWARD    **** IDLE ****     **** 2250 ****      **** IDLE ****    **** 2250 ****     **** IDLE ****     **** 2250 ****
                H.C.     C.O.       H.C.    C.O.        H.C.    C.O.      H.C.    C.O.       H.C.     C.O.      H.C.     C.O.
  13,751
VEHICLES        108      92         64      55          99      81        60      50         9 8%     11 12%    4 6%     5 9%
               * AVERAGE COST OF INSPECTION $     14.58                 AVERAGE COST OF REPAIRS $     .21

VEHICLES       ********** B E F O R E **********      ********** A F T E R **********      A V E R A G E   R E D U C T I O N
ALL YEARS      **** IDLE ****     **** 2250 ****      **** IDLE ****    **** 2250 ****     **** IDLE ****     **** 2250 ****
                H.C.     C.O.       H.C.    C.O.        H.C.    C.O.      H.C.    C.O.       H.C.     C.O.      H.C.     C.O.
  40,820
VEHICLES        201      194        139     136         181     169       127     124        20 10%   25 13%    12 9%    12 9%
               * AVERAGE COST OF INSPECTION $     13.84                 AVERAGE COST OF REPAIRS $     .43

NOTE: AVERAGE COST OF INSPECTION INCLUDES $2.00 CERTIFICATE FEE
```

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NEVADA-- PRESCRIBED INSPECTION PROCEDURES

STEP 1: *A visual inspection must be made of the exhaust system for visible smoke and blowby gases while the engine is at idle and fast idle, and a check of the vehicle must be made to ensure that all emission control devices required by this state and the Federal Government are connected.*

STEP 2: *After the motor vehicle has been to normal operating temperature, connect motor vehicle to engine diagnostic equipment. The infra-red exhaust analyzer shall be adjusted according to the manufacturer's specifications. Place the probe in the tail pipe. With engine running, record the RPM idle and steady HC and CO levels. If dual exhaust, probe both. Increase RPM to 2250, record steady levels of HC and CO.*

STEP 3: *Adjust the following to manufacturer's specifications, including recommended tolerances:*

A. Idle speed (± 50RPM) in addition to manufacturer's specifications.
B. Dwell
C. Air gap
D. Timing (± 5°)in addition to manufacturer's specifications.

STEP 4: *While vehicle is still connected to the diagnostic equipment, record the steady HC and CO levels at the manufacturer's idle RPM. Increase RPM to 2250 record steady HC and CO levels.*

STEP 5: *If the vehicle is found not to exceed the maximum levels for HC and CO set forth in these regulations at either idle or 2250 RPM, although the vehicle has missing pollution control devices, exclusive of the catalytic converter, and if the vehicle has no blowby or visible smoke the approved inspector shall complete and sign the certificate of compliance, designating on the certificate that an exemption from the requirement for the missing devices has been granted.*

STEP 6: *If the vehicle is found to exceed the maximum levels for HC and CO set forth in these regulations at either idle or 2250 RPM, and if no blowby or visible smoke is evident, the approved inspector shall complete and issue an application for a waiver.*

STEP 7: *The following information must be recorded on a certificate of compliance or an application for a waiver:*

Make, model, and year of vehicle ______________________________
Engine type ____________*CID*______________*CYL*____
Vehicle identification number ______________________________
Odometer reading ______________________________
Before HC and CO readings ______________________________
Dwell or air gap ______________________________
Ignition timing ______________________________
Idle setting (rpm) ______________________________
After HC and CO readings ______________________________
Cost of adjustments and parts ______________________________

EXHAUST EMISSION STANDARDS

Model Year of Vehicle	*CO (%)*	*HC (ppm)*
1966 - 1967, inclusive	*7.5*	*1200*
1968 - 1969, inclusive	*5.0*	*600*
1970 - 1974, inclusive	*4.0*	*400*
1975 and later	*3.0*	*300*

I certify under penalty of perjury that I have read and understand these Prescribed Inspection Test Procedures.

______________________ ____*Signature* ______________________*Date.*

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NEVADA -- QUALIFICATIONS FOR AN APPROVED INSPECTOR'S LICENSE

3.12.1 No person will be approved as an inspector unless he has demonstrated his qualifications and ability to the satisfaction of the department by:

3.12.1.1 Submitting an application on the form provided by the department which establishes that the applicant is qualified to make all necessary adjustments of emission control devices according to the manufacturer's specifications, record necessary information, and inspect and test the operation of federally required emission control devices:

3.12.1.2 Submitting a certificate of competence which indicates his technical ability in major motor vehicle tune-ups in accordance with accepted practices of the industry:

3.12.1.3 Submitting a certificate of competence as issued by the manufacturer of an exhaust gas analyzer approved by the department, indicating his ability to adjust and operate that equipment: and

3.12.1.4 Successfully completing a written test which was prepared by the department, with a grade score of not less than 75 percent and, if required, by performing a practical demonstration of Prescribed Test Procedures.

3.12.1.5 At the discretion of the Department of Motor Vehicles, an applicant who fails to pass the inspector's test may be required to wait for a period of seven calendar days before he may retake the approved inspector's test.

3.12.1.6 Every inspector approved by the department shall report in writing to the department every change in his place of employment and any termination of his employment within 10 days after the date when the change or termination occurred.

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STATE OF NEVADA
DEPARTMENT OF MOTOR VEHICLES
REGISTRATION DIVISION

EMISSION CONTROL SECTION

2701 E Sahara
Las Vegas, Nevada

APPLICATION FOR "APPROVED INSPECTOR"

I hereby make application for a certificate as an "APPROVED INSPECTOR" for the purpose of inspecting, installing, maintaining and adjusting motor vehicle emission control devices.

NAME: (Please print)____
(Last) (First) (Middle)

Residence address:____
(Number and street) (City) (Telephone)

Social Security No.________________ Driver's License No.__________State_____

Current Employer____

Address:____
(Number and street) (City) (State)

Birthday Mo. Day Year	Sex	Height Feet In.	Weight	Color Hair	Color Eyes

MECHANICAL EXPERIENCE AND EMPLOYMENT RECORD (list most recent first)

From Month Year	To Month Year	Duties Performed	Employers Name & Address

Experience in automotive tune-up __________years

Experience in automotive repair __________years

*Automotive tune-up class or school __________hours

*Automotive repair class or school __________hours

*Must be documented and copies of such documentation to accompany this application.

Experience emission analyzing: ______________ years.

Emission analyzing equipment qualified to operate:

Make: (1) ____

(2) ____

(3) ____

Copies of certifications or copies of other documents attesting to the operation of the above listed equipment must accompany this application.

Remarks pertaining to additional qualifications: ____________________

____

____

I certify under penalty of perjury the foregoing information is true.

Signed ______________________________ Date ________________, 19____

DMV USE ONLY

Written test completed: Passed ☐ Yes ☐ No Score ________ %

Appropriate documents attached ☐ Yes ☐ No

Certificate of Competence attached ☐ Yes ☐ No

List those missing: ____

____

REMARKS: ____

____

____

Approved Inspector's Certificate issued: Number ______________

Investigator's signature ______________________________ date __________, 19___

4.2 Exhaust Gas Analyzer Performance Specifications

4.2.1 The analyzing device shall measure carbon monoxide expressed as percent carbon monoxide in air and measure hydrocarbons as hexane expressed as parts per million of hydrocarbons (hexane) in air. The device shall be designed meeting these performance specifications:

	CARBON MONOXIDE	HYDROCARBONS
Units	%	PPM
Accuracy of reading	±0.3 units on 10% sacle	±50 units on 2000 scale ppm
Drift -- 2 hours	±0.1 units	±15 units
Repeatability	1% FS	1% FS
Min. detectable limits	0.5 units	100 units

Calibration--2 point dynamic calibration.
Readout--Dual digital or dual meters. Digital elements must be 0.5 inch in height, or each meter shall have a 4 inch effective scale width.

If the department has reason to believe any infrared exhaust gas analyzer is not in compliance with requirements of this section, the department may require such equipment to be laboratory tested by an independent source other than the manufacturer of the equipment.

4.2.1.1 An infrared analyzer which is red tagged because it is not suitable for use must not be returned to service until its accuracy is verified by an emission control officer. An authorized station or fleet station may lease, borrow or rent an emission analyzer for temporary use while the station's approved analyzer is being repaired if the substitute infrared analyzer is on the list of approved exhaust analyzers and an emission control officer has verified its accuracy and has approved its use.

NEVADA -- APPROVED GAS ANALYZERS

A.C.
ST-500

ALLEN
23-067
23-070
23-080
23 360CA
18-090
18-150
23-370CA
23 380CA

AMC
23-067
23-077
23-087
18-097
18-157

ATLAS BRAND
AET-340
ADC-120ME
ADC-120MAE
AET-330
AET-345
AEA-313 376
AMA-313
AMA-550
46-776C-AMA 313 C

AUTOSCAN
700 HC/CO
705-C
710-C
1R-C

BALKAMP
14-4787

BARNES
1836C
8335C
8335T

BOSCH
EFAW-289

BECKMAN
590

CHRYLSER CORPORATION
111
23-066
23-076
23-086
111C
18-156
18-096

CHRYSLER MASTER TECHNICIAN
HCE-211C

CHRISTIE ELECTRIC CORPORATION
EA-74C
EA-74

COMMERICAL ELECTRONICS INC
715

FOX
1800

HORIBA INSTRUMENTS CORPORATION
GSM-300
MEXA-300

KAL-EQUIP
4094
4094D

KING
770

MINE SAFETY APPLIANCE
303

MARQUETTE BRAND
42-169
42-153
40-222
40-225
40-176
40-276
42-076
40-176A

MILEX
1856

PEERLESS
660
675

MOPAR DIVISION
1-3000C

STEWART-WARNER
31-60A

POWEREADY
370-400

SUN ELECTRIC
EPA 75 AMA-450
EET 910 1 78-0027
U 912 1 TUT 1115
2001

SNAP ON TOOLS CORP
MT-495
MT-496
MT-496S

SCOTT ENVIRONMENTAL TECHNOLOGY INC
111C

ROTUNDA
BRE 42-730
BRE 42-732
23-065
23-076
23-085
19-095
18-155
BRE 42-735

DEPARTMENT OF MOTOR VEHICLES
REGISTRATION DIVISION
EMISSION CONTROL SECTION

Requirements To Obtain a License as an Authorized Station

Reproduced from best available copy.

1. Apply for and completes an application.
   (application forms are provided by the department

2. Proof that applicant has an established place of business:
   "Established place of business means - The permanent structure owned either in fee or leased with sufficient spacd to test, inspect or adjust, if needed, one or more vehicles which a certificate of compliance or waiver application may be issued, and (2) large enough to accommodate the office or offices of an authorized station to provide a safe place to keep the books, certificates of compliance, and all other records of this authorized station, at which site or location the principal portion of such licensee's business shall be open to inspection during visual business hours by any authorized agent of the Department of Motor Vehicles.

3. Before a license for an authorized station is furnished to any person, the department will require that the applicant procure and file with the Department a good and sufficient bond in the amount of $1,000.00 with a corporate surety thereon, duly licensed to do business within the State of Nevada, approved as to form by the attorney general, or place on deposit with the department (a) cash, (b) a bond issued by the United States, (c) a savings certificate in the amount of $1,000.00, and conditioned that the applicant shall conduct his business as an authorized station with out fraud or fraudulent representation and without violation of the provisions of Chapter 445 of NRS or these regulations.

4. The department will inspect authorized stations and certify that they are properly equipped and their personnel are adequately trained to issue certificate of compliance or applications for waiver in accordance with the procedures of the department. On or after January 1, 1980, a person making application to become licensed as an authorized station must provide equipment necessary to perform the inspection required in Article 4.1. The equipment must include the following, singly or in combination:
   1. Ignition analyzer oscelloscope or equivalent.
   2. Ohmmeter
   3. Voltmeter
   4. Tachometer
   5. Vacuum gauge
   6. Cam angle dwell meter
   7. Ignition timing light
   8. Compression tester
   9. State approved infra-red analyzer
   10. Distributor advance tester.

5. No license shall be issued to an applicant unless the applicant employs at least one approved inspector, who may be the station owner.

6. Licensing Fee is $25.00. License expires at midnight on December 31 of each calendar year.

7. City or County license, if required.

NEVADA

LICENSE STATION CHECK LIST

DATE ____________________

STATION NAME ____________________ EA # ____________________
ADDRESS ____________________ NO. OF INSPECTORS ____________________

	Yes	No
License displayed		
Station		
Inspectors		
Regulation sign posted		
References available		
State exhaust emission standards		
Specification manual		
Titles		
Tune-up equipment		
Are the inspection records available and complete		
Are the Certificate of Compliance forms available		
Are they filled out properly		
Remarks		

Type of infra red equipment ____________________ Model ____________________

Serial Number ____________________

****

Calibration Test

Tolerances

Correlation factor ____________________

Propane ____________________ PPM

HC PPM _____ _______________ _____
Hi Standard Low

CO % _____ _______________ _____
Hi Standard Low

						Time
1st test reading:	CO	%	HC		PPM	
2nd test reading:	CO	%	HC		PPM	
3rd test reading:	CO	%	HC		PPM	
4th test reading:	CO	%	HC		PPM	

****

OUT OF SERVICE

Yes No

REASON: Failed to pass calibration test ______ :License under revocation ____________________
Approved Inspector not employed ______ :Failure to renew license ____________________
Failure to keep bond in force ______ :Other ____________________

****

Last Certificate of Compliance issued on ____________________ 19___. Cert.# ____________________
This equipment cannot be used for the issuance of a certificate of compliance until released by an agent of the Emission Control Section of the Department of Motor Vehicles. 386-5356.

Station Authorized Representative ____________________

Emission Control Officer ____________________

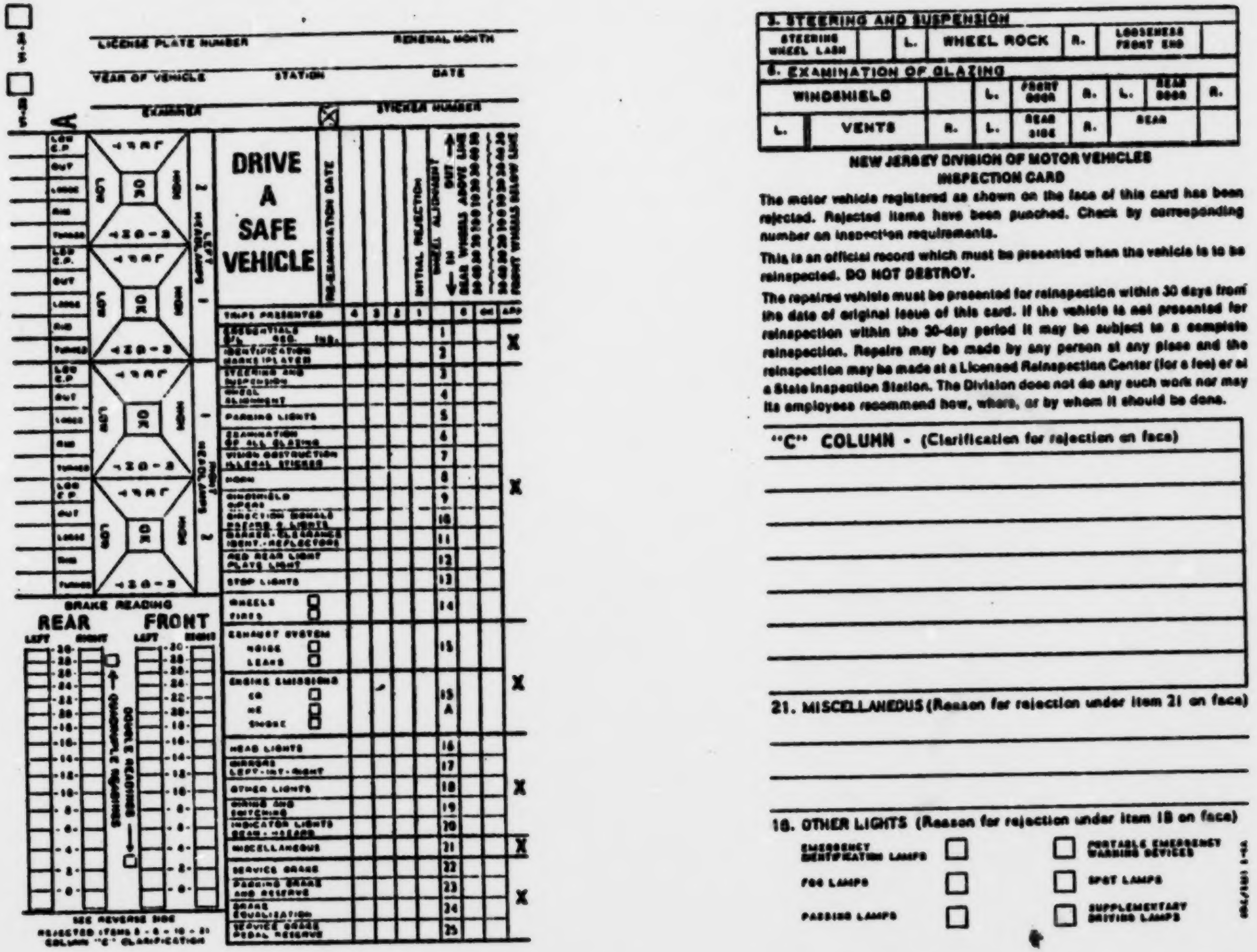
Back in Service: Date ____________________ 19___; Time ____________________ AM __________ PM __________

Emission Control Officer ____________________

APPENDIX F

LIST OF NEW JERSEY APPENDIX MATERIAL

	Page
Inspection Results Form	F-2
Idle Emission Data Sheet	F-3
Cost Study of Emission-Related Repairs	F-4
Codes to be used with NJDEP and DMV "Cost Study of Emission Related Repairs" Form	F-5
Failure Rate Reports	F-6
Monthly Vehicle Inspection Report, November 1979	F-7
Monthly Vehicle Inspection Report, Cumulative 1979	F-8
Monthly Vehicle Inspection Report, November 1979	F-9
Data Summary for all Stations	F-10
Calibration Procedure	F-11
Reinspection Station Test Procedure & Standards	F-15



LICENSE PLATE NUMBER RENEWAL MONTH

YEAR OF VEHICLE STATION DATE

EXAMINER ☒ STICKER NUMBER

DRIVE A SAFE VEHICLE

RE-EXAMINATION DATE

INITIAL REJECTION

WHEEL ALIGNMENT OUT ↑ IN ↓

							C
TIMES PRESENTED	4	3	2	1			
ESSENTIALS 2/3 REG. INS.					1		X
IDENTIFICATION MARKS/PLATES					2		
STEERING AND SUSPENSION					3		
WHEEL ALIGNMENT					4		
PARKING LIGHTS					5		
EXAMINATION OF ALL GLAZING					6		
VISION OBSTRUCTION ILLEGAL STICKERS					7		
HORN					8		X
WINDSHIELD WIPERS					9		
DIRECTION SIGNALS HAZARD LIGHTS					10		
MARKER-CLEARANCE IDENT.-REFLECTORS					11		
RED REAR LIGHT PLATE LIGHT					12		
STOP LIGHTS					13		
WHEELS ☐ TIRES ☐					14		
EXHAUST SYSTEM NOISE ☐ LEAKS ☐					15		
ENGINE EMISSIONS CO ☐ HC ☐ SMOKE ☐					15 A		X
HEAD LIGHTS					16		
MIRRORS LEFT-INT-RIGHT					17		
OTHER LIGHTS					18		X
WIRING AND SWITCHING					19		
INDICATOR LIGHTS BEAM-HAZARD					20		
MISCELLANEOUS					21		X
SERVICE BRAKE					22		
PARKING BRAKE AND RESERVE					23		X
BRAKE EQUALIZATION					24		
SERVICE BRAKE PEDAL RESERVE					25		

LEFT HEADLAMPS 2 1 — HIGH OK LOW

RIGHT HEADLAMPS 1 2 — HIGH OK LOW

BRAKE READING

REAR LEFT RIGHT — FRONT LEFT RIGHT

30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 0

☐ ← QUADRUPLE READINGS

DOUBLE READINGS → ☐

SEE REVERSE SIDE

REJECTED ITEMS 3 - 6 - 18 - 21

COLUMN "C" CLARIFICATION

3. STEERING AND SUSPENSION

STEERING WHEEL LASH		L.	WHEEL ROCK	R.	LOOSENESS FRONT END	

6. EXAMINATION OF GLAZING

WINDSHIELD		L.	FRONT DOOR	R.	L.	REAR DOOR	R.
L.	VENTS	R.	L.	REAR SIDE	R.	REAR	

NEW JERSEY DIVISION OF MOTOR VEHICLES
INSPECTION CARD

The motor vehicle registered as shown on the face of this card has been rejected. Rejected items have been punched. Check by corresponding number on inspection requirements.

This is an official record which must be presented when the vehicle is to be reinspected. DO NOT DESTROY.

The repaired vehicle must be presented for reinspection within 30 days from the date of original issue of this card. If the vehicle is not presented for reinspection within the 30-day period it may be subject to a complete reinspection. Repairs may be made by any person at any place and the reinspection may be made at a Licensed Reinspection Center (for a fee) or at a State Inspection Station. The Division does not do any such work nor may its employees recommend how, where, or by whom it should be done.

"C" COLUMN - (Clarification for rejection on face)

21. MISCELLANEOUS (Reason for rejection under item 21 on face)

18. OTHER LIGHTS (Reason for rejection under item 18 on face)

EMERGENCY IDENTIFICATION LAMPS ☐ ☐ PORTABLE EMERGENCY WARNING DEVICES

FOG LAMPS ☐ ☐ SPOT LAMPS

PASSING LAMPS ☐ ☐ SUPPLEMENTARY DRIVING LAMPS

New Jersey Inspection Results Reporting Form (Front and Back)

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NEW JERSEY -- IDLE EMISSION DATA SHEET

Form VMY-001 5/77

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

VEHICLE IDLE EMISSION INVENTORY

IDLE INSPECTION DATA SHEET

SUBMITTED BY:

NAME ______________________________

PHONE ______________________________

Job No. : CCL8937550

Phase : ☐ X8VMVH01 – Create Initial Data Tape
☐ X8VMVR13 – Add Corrected Data

EDIT BYPASS	CUMULATIVE NUMBER		DAILY NUMBER		MODEL YEAR		MAKE CODE		MODEL CODE		ENGINE SIZE		HC (PPM)		CO (%)		SMOKE		INSP. STA.		ODOMETER		INSP. NO.		MONTH	DAY	YEAR
1	2 3 4 5	6	7 8 9	10	11 12	13	14 15 16 17	18	19 20 21 22	23	24 25 26	27	28 29 30 31	32	33 34 35 36	37	38	39	40 41	42	43 44 45 46 47	48	49	50	51 52	53 54	55 56
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Reproduced from best available copy.

NEW JERSEY -- COST STUDY OF EMISSION-RELATED REPAIRS

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
AND DIVISION OF MOTOR VEHICLES
COST STUDY OF EMISSION RELATED REPAIRS

Investigator: ____________

Region: ____________ Date:

Reinspection Ctr. Identification Number	Type of Center	Model Year	Make of Car	Odometer	Date of Inspection Rejection	CO Failure	HC Failure	Smoke Failure	Cost of Parts	Cost of Labor	Total Cost	Type of Repair	-
1 2 3 4	6	8 9	11 12 13 14	16 17 18 19 20 21	23 24 25 26 27 28	30	32	34	36 37 38 39 40	42 43 44 45 46	48 49 50 51 52	54	56 57 58 59 60
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Codes to be used with NJDEP and DMV "Cost Study of Emission Related Repairs" form

Column 6: Type of Center

D = Automobile Dealer
G = Garage
S = Service Station (gas station)
O = Other

Columns 11 - 14: Make of Car

AMCO = American Motors
AUDI = Audi
AUHE = Austin Healey
AUST = Austin
BMWO = BMW
BUCK = Buick
CADI = Cadillac
CHEK = Checker
CHEV = Chevrolet
CHRY = Chrysler
DATS = Datsun
DODG = Dodge
FIAT = Fiat
FORD = Ford
HOND = Honda
INTE = International
JAGU = Jaguar
JEEP = Jeep
LINC = Lincoln
MAZD = Mazda
MEBZ = Mercedes Benz
MERC = Mercury
MGOO = MG
OLDS = Oldsmobile
OPEL = Opel
OTHR = Other
PLYM = Plymouth
PONT = Pontiac
PORS = Porsche
PUGT = Peugeot
RENA = Renault
SAAB = Saab
SUBA = Subaru
TOYO = Toyota
TRIP = Triumph
VOLK = Volkswagen
VOLV = Volvo

Columns 30, 32, 34: Emissions Failures

1 = Vehicle failed for this pollutant

0 = Vehicle did not fail for this pollutant

Column 54: Type of Repair

0 = Adjust carburetor, idle mixture and/or idle speed

1 = " " and ignition system repair or timing

2 = Ignition system work (new plugs, wires, etc.)

3 = " " " + emission system work (PCV, EGR, etc.)

4 = " " " + emission system work + adjust and/or repair carburetor (repair carb. implies "external" work like a vacuum leak or choke repair).

5 = Adjust and/or repair carburetor + emission system work

6 = Rebuild or replace carburetor

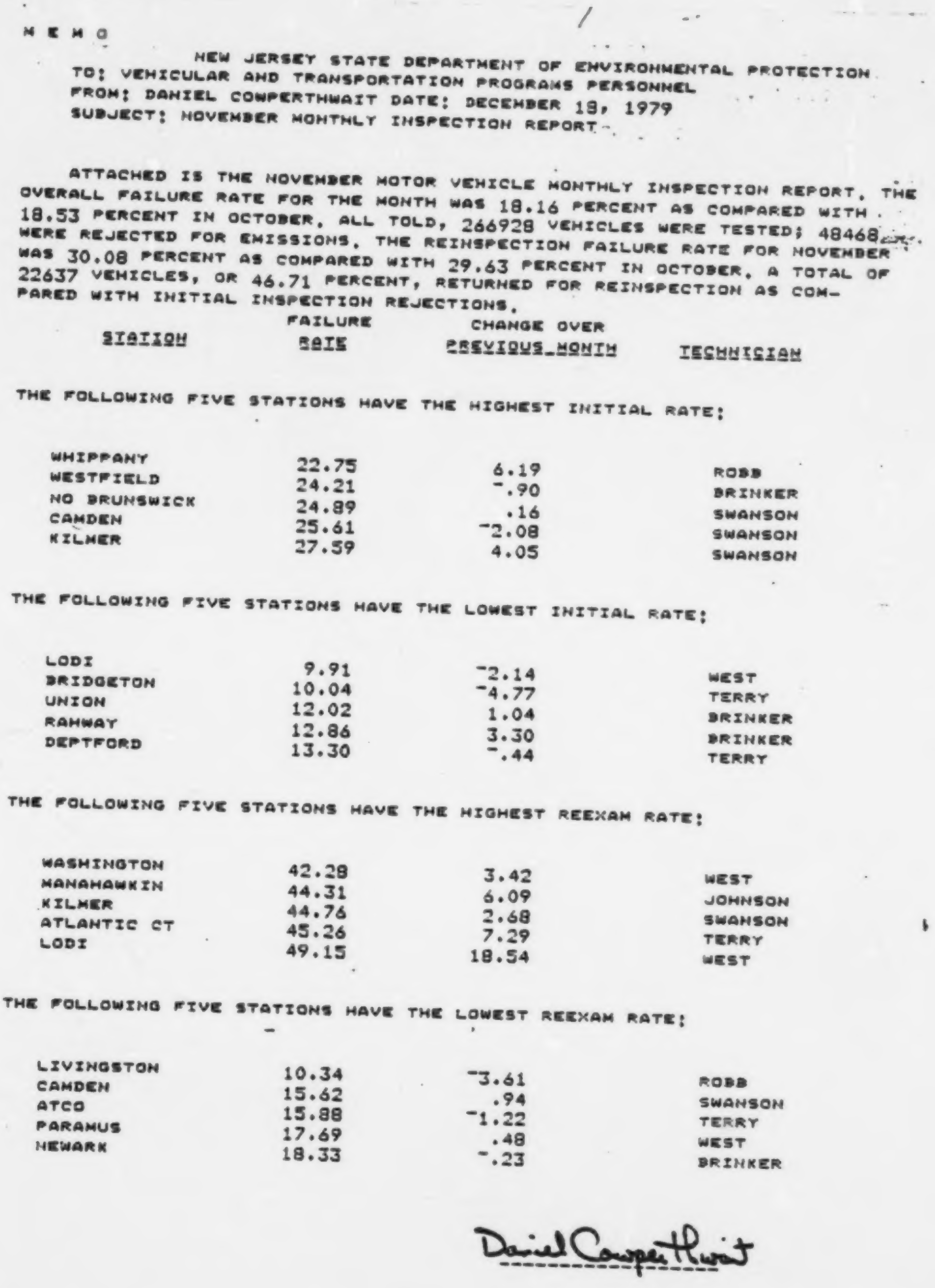
7 = Rings and/or valves (major engine work)

8 = Refill or replace catalyst

9 = Other (replace air pump, e.g.)

Columns 56 - 60: Leave blank

NEW JERSEY -- FAILURE RATE REPORTS



M E M O

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION
TO: VEHICULAR AND TRANSPORTATION PROGRAMS PERSONNEL
FROM: DANIEL COWPERTHWAIT DATE: DECEMBER 18, 1979
SUBJECT: NOVEMBER MONTHLY INSPECTION REPORT

ATTACHED IS THE NOVEMBER MOTOR VEHICLE MONTHLY INSPECTION REPORT, THE OVERALL FAILURE RATE FOR THE MONTH WAS 18.16 PERCENT AS COMPARED WITH 18.53 PERCENT IN OCTOBER, ALL TOLD, 266928 VEHICLES WERE TESTED; 48468 WERE REJECTED FOR EMISSIONS, THE REINSPECTION FAILURE RATE FOR NOVEMBER WAS 30.08 PERCENT AS COMPARED WITH 29.63 PERCENT IN OCTOBER, A TOTAL OF 22637 VEHICLES, OR 46.71 PERCENT, RETURNED FOR REINSPECTION AS COMPARED WITH INITIAL INSPECTION REJECTIONS.

STATION	FAILURE RATE	CHANGE OVER PREVIOUS_MONTH	TECHNICIAN
THE FOLLOWING FIVE STATIONS HAVE THE HIGHEST INITIAL RATE:			
WHIPPANY	22.75	6.19	ROBB
WESTFIELD	24.21	¯.90	BRINKER
NO BRUNSWICK	24.89	.16	SWANSON
CAMDEN	25.61	¯2.08	SWANSON
KILMER	27.59	4.05	SWANSON
THE FOLLOWING FIVE STATIONS HAVE THE LOWEST INITIAL RATE:			
LODI	9.91	¯2.14	WEST
BRIDGETON	10.04	¯4.77	TERRY
UNION	12.02	1.04	BRINKER
RAHWAY	12.86	3.30	BRINKER
DEPTFORD	13.30	¯.44	TERRY
THE FOLLOWING FIVE STATIONS HAVE THE HIGHEST REEXAM RATE:			
WASHINGTON	42.28	3.42	WEST
MANAHAWKIN	44.31	6.09	JOHNSON
KILMER	44.76	2.68	SWANSON
ATLANTIC CT	45.26	7.29	TERRY
LODI	49.15	18.54	WEST
THE FOLLOWING FIVE STATIONS HAVE THE LOWEST REEXAM RATE:			
LIVINGSTON	10.34	¯3.61	ROBB
CAMDEN	15.62	.94	SWANSON
ATCO	15.88	¯1.22	TERRY
PARAMUS	17.69	.48	WEST
NEWARK	18.33	¯.23	BRINKER

Daniel Cowperthwait

DATE: DECEMBER 18, 19

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
AND
DIVISION OF MOTOR VEHICLES

MONTHLY VEHICLE INSPECTION REPORT

NOVEMBER 1979

	INITIAL			REEXAMS				
STATION	EXAMS	FAIL	PERCENT	REEXAMS	RETURN	FAIL	PERCENT	TECH
ASBURY PARK	4847	786	16.22	521	66.28	213	40.88	JOHNSON
ATCO	4744	809	17.05	340	42.03	54	15.88	TERRY
ATLANTIC CT	5714	1071	18.74	369	34.45	167	45.26	TERRY
BRIDGETON	2649	266	10.04	225	84.59	52	23.11	TERRY
BURLINGTON	4540	816	17.97	378	46.32	97	25.66	BANKS
CAMDEN	13699	3508	25.61	1306	37.23	204	15.62	SWANSON
CAPE MAY	3131	550	17.57	255	46.36	84	32.94	TERRY
DEPTFORD	9332	1241	13.30	674	54.31	177	26.26	TERRY
EATONTOWN	10529	1443	13.71	692	47.96	183	26.45	JOHNSON
FLEMINGTON	3283	589	17.94	329	55.86	110	33.43	BANKS
FREEHOLD	6344	1164	18.35	561	48.20	187	33.33	JOHNSON
HACKENSACK	4780	960	20.08	391	40.73	138	35.29	WEST
JERSEY CITY	6481	1180	18.21	826	70.00	216	26.15	BANKS
KILMER	7297	2013	27.59	840	41.73	376	44.76	SWANSON
LIVINGSTON	4641	853	18.38	232	27.20	24	10.34	ROBB
LODI	13275	1315	9.91	468	35.59	230	49.15	WEST
MANAHAWKIN	2415	422	17.47	246	58.29	109	44.31	JOHNSON
MILLVILLE	4254	958	22.52	495	51.67	143	28.89	TERRY
MONTCLAIR	8357	1654	19.79	683	41.29	191	27.96	ROBB
MORRISTOWN	9595	1579	16.46	624	39.52	186	29.81	ROBB
MT, HOLLY	5864	1141	19.46	498	43.65	154	30.92	BANKS
NEWARK	15523	2611	16.82	791	30.29	145	18.33	BRINKER
NEWTON	4986	862	17.29	476	55.22	116	24.37	ROBB
NO BRUNSWICK	4323	1076	24.89	430	39.96	153	35.58	SWANSON
PARAMUS	12693	2579	20.32	1266	49.09	224	17.69	WEST
PLAINFIELD	6033	1198	19.86	783	65.36	304	38.83	BRINKER
RAHWAY	11855	1524	12.86	906	59.45	316	34.88	BRINKER
RIDGEWOOD	6272	1155	18.42	628	54.37	168	26.75	WEST
SALEM	2483	504	20.30	251	49.80	83	33.07	TERRY
SECAUCUS	8146	1650	20.26	636	38.55	206	32.39	BANKS
SOMERVILLE	5346	844	15.79	640	75.83	144	22.50	BANKS
TOMS RIVER	7997	1475	18.44	813	55.12	216	26.57	JOHNSON
TRENTON	12954	2601	20.08	901	34.64	205	22.75	SWANSON
UNION	4526	544	12.02	287	52.76	69	24.04	BRINKER
WASHINGTON	4006	752	18.77	499	66.36	211	42.28	WEST
WAYNE	14322	2483	17.34	1606	64.68	651	40.54	WEST
WESTFIELD	5956	1442	24.21	462	32.04	179	38.74	BRINKER
WHIPPANY	3736	850	22.75	309	36.35	125	40.45	ROBB
TOTAL	266928	48468	18.16	22637	46.71	6810	30.08	

DATE: DECEMBER 18, 197

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
AND
DIVISION OF MOTOR VEHICLES

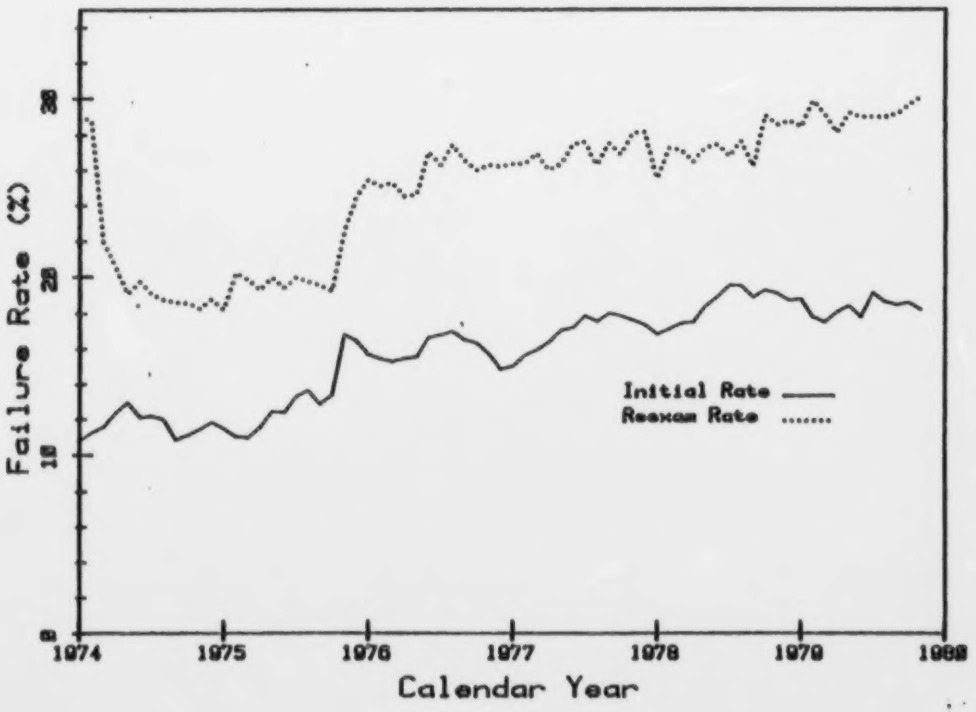
MONTHLY VEHICLE INSPECTION REPORT

CUMULATIVE 1979

	INITIAL				REEXAMS			
STATION	EXAMS	FAIL	PERCENT	REEXAMS	RETURN	FAIL	PERCENT	TECH
ASBURY PARK	60435	10907	18.05	6662	61.08	2638	39.60	JOHNSON
ATCO	62455	10728	17.18	4467	41.64	841	18.83	TERRY
ATLANTIC CT	67106	12053	17.96	4611	38.26	1737	37.67	TERRY
BRIDGETON	33269	5644	16.96	4154	73.60	1163	28.00	TERRY
BURLINGTON	56840	10467	18.41	4938	47.18	1271	25.74	BANKS
CAMDEN	172650	39491	22.87	14866	37.64	2208	14.85	SWANSON
CAPE MAY	37936	6889	18.16	2530	36.73	694	27.43	TERRY
DEPTFORD	120696	14273	11.83	6490	45.47	1692	26.07	TERRY
EATONTOWN	134120	19703	14.69	10619	53.90	2164	20.38	JOHNSON
FLEMINGTON	43296	8176	18.88	4147	50.72	1394	33.61	BANKS
FREEHOLD	82556	16544	20.04	8393	50.73	3587	42.74	JOHNSON
HACKENSACK	58478	10831	18.52	5066	46.77	1522	30.04	WEST
JERSEY CITY	82303	14835	18.02	9448	63.69	2618	27.71	BANKS
KILMER	92125	22472	24.39	10743	47.81	4672	43.49	SWANSON
LIVINGSTON	59782	10659	17.83	2966	27.83	486	16.39	ROBB
LODI	170966	23050	13.48	7482	32.46	2158	28.84	WEST
MANAHAWKIN	30869	5078	16.45	2632	51.83	878	33.36	JOHNSON
MILLVILLE	55918	12153	21.73	6611	54.40	1909	28.88	TERRY
MONTCLAIR	104751	20606	19.67	8782	42.62	2505	28.52	ROBB
MORRISTOWN	121337	21545	17.76	9657	44.82	2975	30.81	ROBB
MT. HOLLY	76163	17222	22.61	6218	36.10	1905	30.64	BANKS
NEWARK	191699	31032	16.19	10914	35.17	2051	18.79	BRINKER
NEWTON	67243	11748	17.47	6540	55.67	1954	29.88	ROBB
NO BRUNSWICK	54789	12570	22.94	4204	33.44	1217	28.95	SWANSON
PARAMUS	164687	29329	17.81	14256	48.61	2548	17.87	WEST
PLAINFIELD	76417	15954	20.88	9578	60.04	3093	32.29	BRINKER
RAHWAY	148595	19091	12.85	11672	61.14	3568	30.57	BRINKER
RIDGEWOOD	78081	13529	17.33	7323	54.13	1869	25.52	WEST
SALEM	32230	5328	16.53	2948	55.33	1016	34.46	TERRY
SECAUCUS	101288	19150	18.91	8058	42.08	2360	29.29	BANKS
SOMERVILLE	65917	13489	20.46	9325	69.13	2144	22.99	BANKS
TOMS RIVER	100532	17676	17.58	9472	53.59	2523	26.64	JOHNSON
TRENTON	158953	31152	19.60	11120	35.70	2438	21.92	SWANSON
UNION	52837	6943	13.14	3531	50.86	811	22.97	BRINKER
WASHINGTON	52333	9051	17.30	5440	60.10	2170	39.89	WEST
WAYNE	183603	38094	20.75	20772	54.53	8838	42.55	WEST
WESTFIELD	75596	18805	24.88	7065	37.57	2654	37.57	BRINKER
WHIPPANY	47888	9516	19.87	3806	40.00	1348	35.42	ROBB
TOTAL	3376739	615783	18.24	287506	46.69	83619	29.08	

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
AND
DIVISION OF MOTOR VEHICLES

MONTHLY VEHICLE INSPECTION REPORT
NOVEMBER 1979



NEW JERSEY -- DATA SUMMARY FOR ALL STATIONS

NEW JERSEY DIVISION OF ENVIRONMENTAL QUALITY
MOTOR VEHICLE INSPECTIONS
DATA SUMMARY

All Stations

	Nov 1978	Nov 1979	Cumulative 1979
Total Initial Handlings	272,696	266,928	3,376,739
Initial Emission Rejection Rate (Percent)	19.05%	18.16%	18.24%
Total (Safety and Emission) Initial Rejection Rate (Percent)	48.11%	47.30%	47.38%
Total Reexam Handlings	77,730	78,837	928,130
Reexam Emission Rejection Rate (Percent)	8.74%	9.22%	9.00%
Total (Safety and Emissions) Reexam Rejection Rate (Percent)	26.64%	26.14%	26.17%
Waiting Time (Minutes)	6	6	6

CALIBRATION PROCEDURE

Since exhaust analyzers are extremely sensitive instruments, careful maintenance and calibration is necessary. Exhaust gas analyzers are of major assistance to the mechanic when they are in good working order. When they are not in good working order, they can be misleading and the cause of wasted effort.

The basic guide for maintaining any specific analyzer is the manual which comes with the instrument. This manual must be followed to the letter. Since there are major differences between instruction procedures used for the various analyzers, no attempt is made here to provide the detailed guidance which would apply to each of the approved models.

"Zero set" and "span" adjustments are vital. After the analyzer has been warmed up, these adjustments should be performed as described in the manufacturer's manual before each emissions test. Carelessness with these two adjustments will defeat the purpose of the analyzer.

Of equal importance is periodic calibration of the analyzer. The analyzer's accuracy is checked by sampling a standard gas with known concentrations of carbon monoxide and hydrocarbons. The analyzer should accurately identify the composition of this test gas within the permitted tolerances.

Gas calibration should be performed as often as it is necessary to maintain analyzer accuracy. This is at least every two weeks when performed by shop personnel, or every three months when performed by a service contractor. Records of calibration, including date of calibration, calibration gas standard, observed and/or corrected equipment reading and calibrator's signature, should be recorded in a log or on a sticker supplied by the Division of Motor Vehicles.

At Licensed Motor Vehicle Reinspection Centers, Division of Motor Vehicle investigators will check calibration and review calibration procedures at least once every two months. Analyzers which cannot be calibrated within permitted tolerances will be placed "out of service" until repairs have been made by a manufacturer-authorized service/calibration representative. Figure 2 is an illustration of the calibration gas equipment used in the official New Jersey calibration procedure.

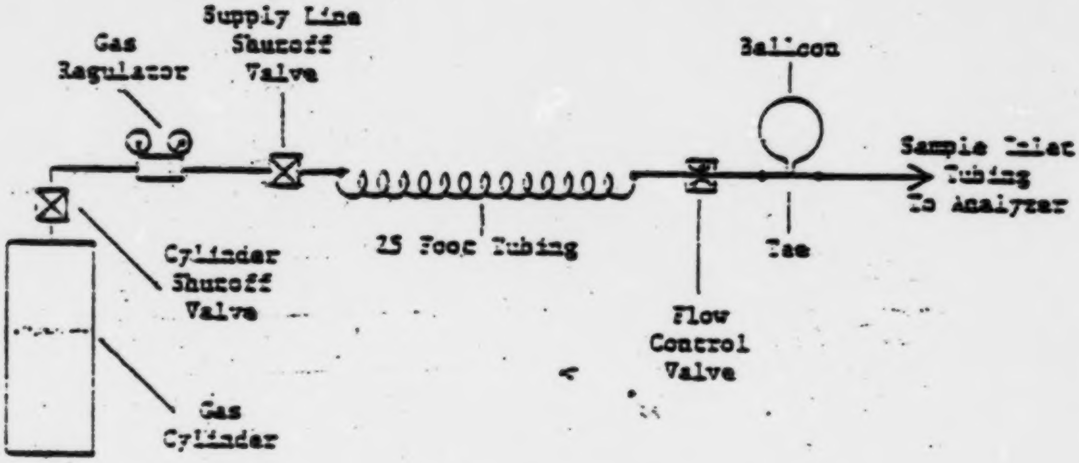

Gas Regulator
Supply Line Shutoff Valve
Balloon
Sample Inlet Tubing To Analyzer
Cylinder Shutoff Valve
25 Foot Tubing
Tee
Flow Control Valve
Gas Cylinder

Figure 2.

The official New Jersey calibration procedure is as follows:

1. The analyzer shall be warmed up for at least thirty minutes prior to testing. (Reinspection center personnel shall be responsible for this requirement prior to investigator's visit.)

2. The zero and span control setting should be checked and, if necessary, corrected. If the zero and span cannot be set with drift less than 60 ppm (HC) and 0.3% (CO) over a 30-second period, the calibration certification sticker must be marked disapproved and an out-of-service sticker shall be attached to the analyzer. Figure 3 illustrates the calibration certification and out-of-service stickers. If the zero and span drift are within these limits, continue with the rest of this procedure.

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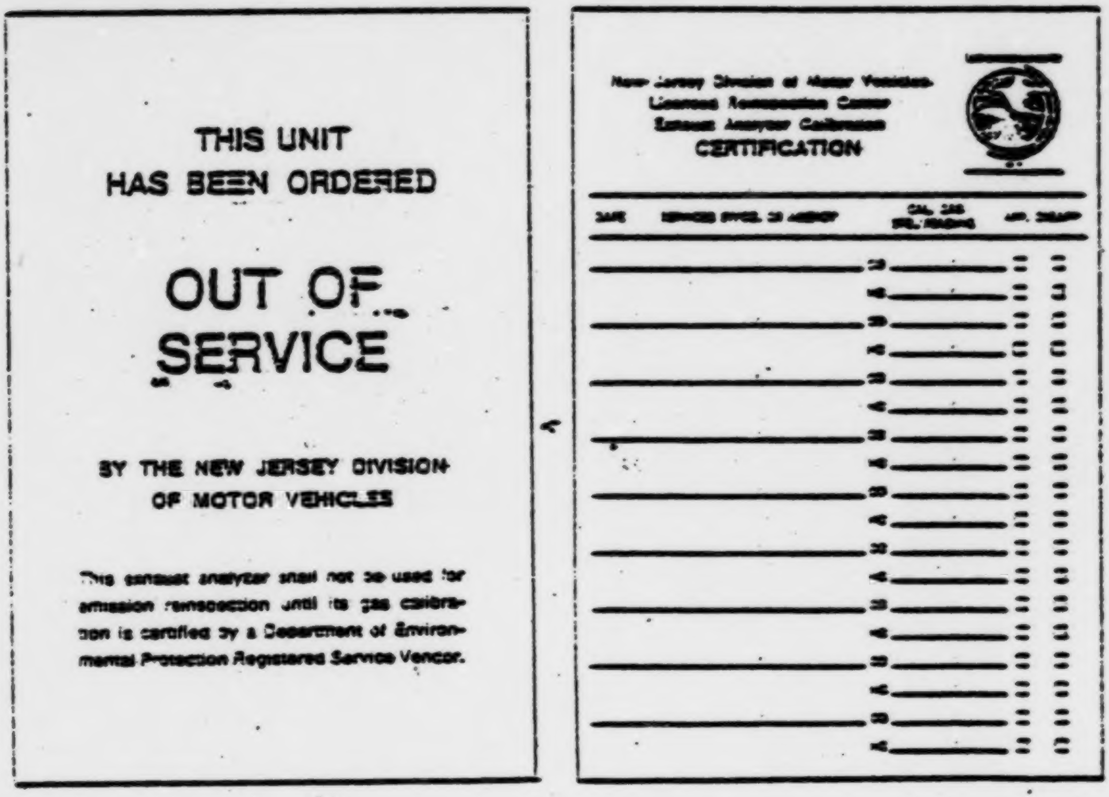


THIS UNIT
HAS BEEN ORDERED

OUT OF
SERVICE

BY THE NEW JERSEY DIVISION
OF MOTOR VEHICLES

This exhaust analyzer shall not be used for emission reinspection until its gas calibration is certified by a Department of Environmental Protection Registered Service Vendor.

New Jersey Division of Motor Vehicles
Licensed Reinspection Center
Exhaust Analyzer Calibration
CERTIFICATION

Figure 3.

3. The calibration gas cylinder will be labeled with the concentration of propane in ppm and CO in percentage. Multiply with calibration gas propane concentration by the propane-hexane factor. This factor should be stamped on the cabinet of the analyzer. If no factor is stamped on the cabinet, use a factor of 0.52. This factor when multiplied by the propane concentration should give you the expected analyzer reading for the hydrocarbon scale. Record this number in the proper blank on the sticker. The expected analyzer reading for the CO scale is simply the CO concentration on the cylinder. Record this number in the proper blank on the sticker.

Reproduced from best available copy.

4. Attach the regulator tightly to the calibration gas cylinder. (Note that this connection utilizes a left-handed thread.) Open the cylinder valve shut-off located on top of the cylinder. Read the gas delivery pressure off the regulator gauge. If it is not approximately 10 lbs., adjust it by turning the T-screw on the regulator. This adjustment must be made with both the supply line shut-off valve and flow control valve open. After adjusting, close the flow control valve.

5. To check for analyzer sample hose leaks, secure the hose tightly over the tip of the sample probe. If a low-flow condition is not indicated on the analyzer, there is a leak in the sample hose system which must be corrected before proceeding.

6. Open the flow control valve until the balloon just barely inflates. After 30 seconds, record the analyzer readings in the proper blanks.

7. Pull the hose off the probe and immediately close the flow-control valve and then the shut-off valve on the cylinder. Recheck the zero on the analyzer as in Step 2. The drift must still be within 60 ppm HC and 0.3% CO or an out-of-service sticker must be issued.

8. Reopen the flow-control valve until the pressure drops to zero on both gauges. Then close all valves and remove the regulator from the cylinder. Replace the cylinder cap.

9. Now compare the analyzer readings you recorded against the expected analyzer readings. If the difference is greater than 100 ppm HC or 0.5% CO, the instrument is out of calibration.

10. Affix the filled-out "gas calibration certification sticker" to the analyzer.

Since the analyzers encountered in the garage system will be of many different makes, problems may be encountered with using this procedure on all of them. If such a problem is encountered, call the DEP lab and a technician will attempt to "talk you through" the procedure.

TEST PROCEDURE AND STANDARDS

The Department of Environmental Protection has specified steps which must be followed in order to conduct an emissions inspection test. These are as follows:

1. The test shall be conducted after the engine has been operating for a sufficient period of time to attain normal operating temperature.
2. With the motor vehicle in neutral gear, all accessories off and the hand brake secured, accelerate the engine to approximately 2500 rpm and hold. Observe for visible smoke in the exhaust emissions and/or crankcase emissions.

   NOTE: Any motor vehicle designed primarily for transportation of persons or property and registered at 6,000 pounds gross vehicle weight or less shall not emit visible smoke from the exhaust system or the crankcase.
3. With the engine operating at idle insert the sample probe of the exhaust analyzer into the vehicle's exhaust pipe. The probe tip shall be inserted at least 6 to 12 inches, or as far as possible, into the tailpipe. For dual exhaust vehicles, check both exhaust pipes; the higher reading shall be the exhaust gas measurement.
4. The steady state emissions levels measured as percent carbon monoxide (CO%) and parts per million of hydrocarbons (HC ppm) in the exhaust shall be the inspection test result. These results shall be compared by vehicle model year and effective date as shown in Table 1.

TABLE 1

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
EXHAUST EMISSIONS STANDARDS

Model Year of Vehicle	CO (%)	HC (ppm)
Pre-1968	8.5	1400
1968-1969	7.0	700
1970-1974	5.0	500
1975-1979	3.0	300

IMPORTANT NOTE: The above standards are New Jersey Inspection standards only, not vehicle performance or manufacturers' recommended standards. Service mechanics should maintain vehicles for inspection or sale so that exhaust emissions levels are in accordance with specifications recommended by the manufacturer or seek reasonable emissions levels as shown in Table 2.

TABLE 2

REASONABLE VEHICLE PERFORMANCE EMISSIONS LEVELS

	CO%	Tolerance	HC (ppm)	Tolerance*
Pre-1968 GM Motor Vehicles	3.0	±2.0	700	±200
Pre-1968 Non-GM Motor Vehicles	3.0	±2.0	500	±200
1968-1969 All Vehicles	3.0	±2.0	300	±100
1970-1974 All Vehicles	1.5	±1.0	200	±100
1975-1979 Catalytic Equipped	0.5	±0.5	50	± 25
1975-1979 Non-Catalytic	1.0	±0.5	100	± 50

* The reasonable HC emissions levels can be achieved by most vehicles. However, some low production vehicles may have reasonable HC emissions levels at or above these levels.

APPROVED TEST EQUIPMENT

Emissions analyzers are highly sensitive instruments which measure the amount of carbon monoxide (CO) and hydrocarbons (HC) in the exhaust gases of a motor vehicle. The analyzer's direct reading meters show the mechanic the percentage of carbon monoxide and the parts per million of hydrocarbons in the exhaust. It should be pointed out that the analyzer also can be of great help to the mechanic with his trouble-shooting when emissions are excessive.

No instruments are used to check smoke emissions from automobiles. These emissions are "read by eyeball".

Although exhaust analyzers come in many sizes, shapes and colors, the basic operating fundamentals of these instruments are the same. Exhaust analyzers draw gas samples from the exhaust system of a vehicle. The analyzer filters the sample to remove the water and any small particles of carbon, or other particulates which would interfere with the analysis. The exhaust sample is then passed to the sample cell where detectors and an infrared light source are used to determine the amount of carbon monoxide and hydrocarbons contained in the sample. The detectors provide information to an amplifier which activates the meters to give direct readings of the percentage of carbon monoxide and the parts per million of hydrocarbons in the exhaust sample.

Analyzers used in the New Jersey emissions inspection test must be approved by the Department of Environmental Protection. These analyzers must be of the type employing the Non-Dispersive Infrared (NDIR) principle. The Bureau of Air Pollution Control periodically publishes a list of approved NDIR analyzers. This does not mean the Department recommends any specific analyzer which appears on the list. It does mean that the analyzers named have been examined and tested by Mobile Source Control technicians. These technicians have certified that the analyzers meet the following specifications established by the Department:

General Specifications

1. The instrumentation shall consist of analyzers, sampling system, readout indicators, etc. necessary to diagnose and properly maintain all vehicles to comply with standards established by the New Jersey State Department of Environmental Protection. The system shall be capable of continuously measuring the concentration of carbon monoxide* and hydrocarbons** in vehicle exhaust emissions from a gasoline engine in the idle mode.

2. A direct readout is required for both carbon monoxide and hydrocarbons.

3. The analyzer shall be simple to operate and maintain by garage personnel. The analyzer shall have sufficient durability and ruggedness for frequent use and continuous analysis at various vehicle exhaust flow rates for long periods in a garage environment. Consequently, the operating temperature range shall be between 32°F and 110°F.

4. The analyzer concentration ranges shall be the following:

	High Range	Low Range
CO range:	0-10%	0-4%
HC range:	0-2000 ppm	0-400 ppm Hexane

5. The hexane-propane factor shall be analytically determined at the 6000 ppm carbon concentration and shall be in the range of 0.47 to 0.56. The factor shall be displayed on the outside of the cabinet.

6. Interference from non-interest gases, particulates, and water vapor shall be less than 1%of full scale.

7. The response time for an exhaust gas sample introduced at the probe shall be less than 10 seconds for 90% of the reading.

8. The accuracy of the analyzer shall be greater than ±3% of the full scale reading for all ranges. The zero and span drift shall be no more than ±3% of full scale in two hours.

9. The sample system shall include all components as probe, tubing, pumps, filters, water traps, etc. required to continuously analyze raw exhaust gas. The system shall be easy to clean and maintain.

10. A low flow indicator shall indicate a sample flow degradation sufficient to cause a response time greater than 10 seconds for 90% of the reading.

11. The hydrocarbon hang up shall be measured at 70°F by sampling an idling 8-cylinder engine with one spark plug disconnected to create a concentration between 1500 ppm and 2000 ppm hydrocarbons. After sampling for five minutes, the probe shall be removed from the exhaust pipe and the HC reading shall stabilize within 30 seconds at a reading less than 10% of full scale.

12. The system shall contain a calibration check for performance testing. The calibration method may be a gas standard or other mechanical or electrical method. Air may be used for zero checking. The instrument shall have the capability for gas calibration through both the sampling system and calibration part.

13. Warm-up time shall be as short as possible, but not greater than 15 minutes from a cold start.

14. All electronics shall be solid state.

---

* (as percent CO) at the 4.74-micron band

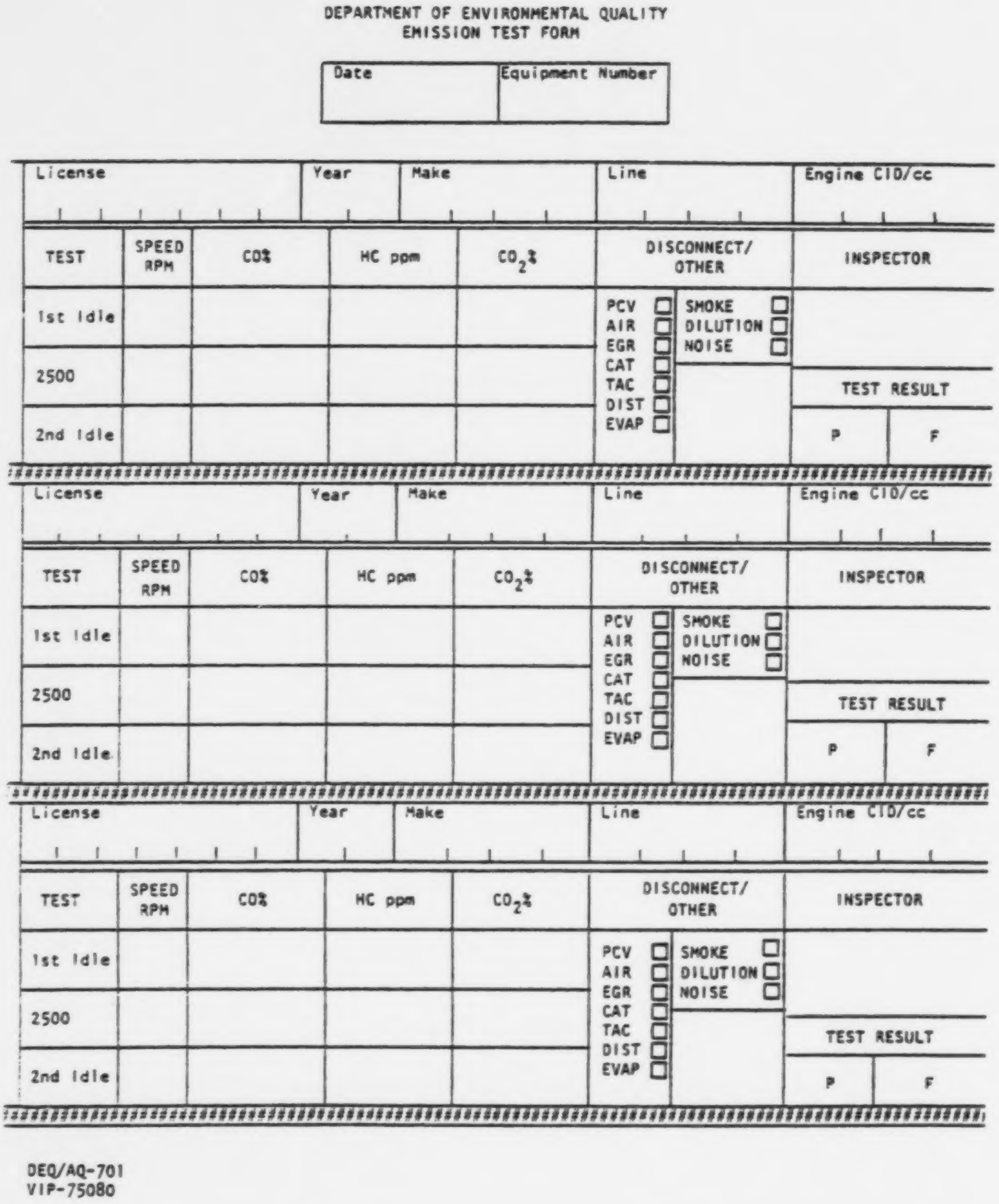
** (as ppm hexane) at the 3.41 micron band

APPENDIX G

LIST OF OREGON APPENDIX MATERIAL

	Page
Emission Test Form	G-2
Noncompliance Form	G-3
Diagnostic Suggestions	G-4
Defect Notification Pollution Control Equipment	G-5
Light-Duty Vehicle Testing Summary	G-7
Waiting Time Survey	G-8
Heavy-Duty Vehicle Testing Summary	G-9
Sample Cumulative Activity Report	G-10
Sample Monthly Activity Report	G-11
Sample Heavy-Duty Vehicle Test Summary	G-12
Waiting Time Survey	G-13
Repair Cost Survey	G-14
Cost of Repair Survey	G-15
Station Supervisors' Calibration Log	G-16
Analyzer Calibration Schedule	G-17
Customer Statement of Replacement Equipment	G-18

OREGON -- EMISSION TEST FORM



DEPARTMENT OF ENVIRONMENTAL QUALITY
EMISSION TEST FORM

Date	Equipment Number

License	Year	Make	Line	Engine CID/cc

TEST	SPEED RPM	CO%	HC ppm	CO$_2$%	DISCONNECT/ OTHER		INSPECTOR	
1st Idle					PCV ☐ AIR ☐ EGR ☐ CAT ☐ TAC ☐ DIST ☐ EVAP ☐	SMOKE ☐ DILUTION ☐ NOISE ☐		
2500							TEST RESULT	
2nd Idle							P	F

License	Year	Make	Line	Engine CID/cc

TEST	SPEED RPM	CO%	HC ppm	CO$_2$%	DISCONNECT/ OTHER		INSPECTOR	
1st Idle					PCV ☐ AIR ☐ EGR ☐ CAT ☐ TAC ☐ DIST ☐ EVAP ☐	SMOKE ☐ DILUTION ☐ NOISE ☐		
2500							TEST RESULT	
2nd Idle							P	F

License	Year	Make	Line	Engine CID/cc

TEST	SPEED RPM	CO%	HC ppm	CO$_2$%	DISCONNECT/ OTHER		INSPECTOR	
1st Idle					PCV ☐ AIR ☐ EGR ☐ CAT ☐ TAC ☐ DIST ☐ EVAP ☐	SMOKE ☐ DILUTION ☐ NOISE ☐		
2500							TEST RESULT	
2nd Idle							P	F

DEQ/AQ-701
VIP-75080

OREGON -- NONCOMPLIANCE FORM

TEST DATE		
Month	Day	Year

DEPARTMENT OF ENVIRONMENTAL QUALITY
VEHICLE INSPECTION PROGRAM
EMISSION CONTROL TEST RESULTS

NONCOMPLIANCE

☐ Carbon Monoxide (CO)
☐ Emission Control Equipment
☐ Idle Speed Too High
☐ Hydrocarbon Gases (HC)
☐ Smoke
☐ Dilution
☐ Exhaust Inaccessible

LICENSE:	YEAR:	MAKE:

VEHICLE STANDARDS AT IDLE		TEST RESULTS		
		IDLE READINGS		EMISSION CONTROL EQUIPMENT DEFECT
CO %	______	CO %	______	1. ☐ Positive Crankcase Ventilation (PCV) System
				2. ☐ Exhaust Modifier System
HC ppm	______	HC ppm	______	3. ☐ Exhaust Gas Recirculation (EGR) System
Idle Speed RPM	______	Idle Speed RPM	______	4. ☐ Evaporative Control System
Minimum Dilution Factor $CO + CO_2$ %	______	Dilution Factor $CO + CO_2$ %	______	5. ☐ Special Emission Control Devices

STATION:	INSPECTOR:
RETEST DATE	Passed:
	Failed:
	Station:

*** ADVISORY ***

EMISSION READINGS AT 2500 RPM WERE: CO % ______

HC ppm ______

INSPECTORS ARE PROHIBITED FROM MAKING ANY RECOMMENDATIONS OR ESTIMATES RELATIVE TO REPAIRS OR REPAIR FACILITY.

GENERAL REPAIR INFORMATION ON REVERSE SIDE.

RETURN COMPLETED FORM AT TIME OF REINSPECTION.

DEQ/AQ- 702

VIP 77192

OREGON -- DIAGNOSTIC SUGGESTIONS

An emission tune-up performed by a qualified technician will usually correct a pollution problem and also improve engine performance and increase gas mileage.

---

1. High carbon monoxide (CO) emissions may be caused by:
   - * Incorrect carburetion adjustments
   - * Choke malfunction
   - * Dirty or worn carburetion system
   - * PCV valve restricted
   - * Severely restricted air cleaner

2. Excessive hydrocarbon gases (HC) may result from:
   - * Faulty ignition system
   - * Improper timing
   - * Excessively lean carburetion adjustments
   - * Defective emission control equipment
   - * Leaking exhaust valves

3. Visible smoke is generally caused by:
   - * Improper or inadequate maintenance
   - * Worn piston rings or valves

4. Pollution control equipment:
   Both Federal and Oregon law prohibit disconnecting, or modifying, or altering the required emission control equipment. This control equipment is designed to reduce exhaust emissions during various driving conditions and not just at idle.

5. Dilution:
   Dilution is generally caused by exhaust system leaks. Such leaks do not allow for a proper emission control test, and may allow dangerous fumes to enter the vehicle.

ADVISORY NOTE: High 2500 RPM readings may indicate that more thorough repairs than simply those affecting the idle mode may be advisable to insure good overall vehicle performance.

TO BE FILLED OUT BY REPAIR FACILITY OR VEHICLE OWNER

Person or Facility Performing Repairs ______________________________

Address ______________________________

Date of Repairs ______________________________

Check the appropriate items below indicating the repairs and adjustments performed:

☐ A/F Mixture
☐ Idle Speed
☐ Air Cleaner
☐ Choke
☐ Carburetion

☐ Dwell/Timing
☐ Spark Plugs
☐ Plug Wires
☐ Distributor
☐ Vacuum Hoses

☐ Other
____
____

TOTAL COST OF REPAIRS: $______________

—— RETURN COMPLETED FORM AT TIME OF REINSPECTION ——

DEQ/AQ- 702 VIP 77192

OREGON

DEFECT NOTIFICATION
POLLUTION CONTROL EQUIPMENT

(Defect Checked Below)

---

1. ☐ Positive Crankcase Ventilation (PCV) System
2. ☐ Exhaust Modifier Systems
3. ☐ Exhaust Gas Recirculation (EGR) System
4. ☐ Evaporative Control System
5. ☐ Special Emission Control Devices ________________

Oregon Law, ORS 483.825, prohibits disconnecting, or modifying, or altering required pollution control equipment. The vehicle inspection program rules adopted by the Environmental Quality Commission prohibit issuing a certificate of compliance to vehicles with pollution control equipment defects.

POLLUTION CONTROL SYSTEMS INCLUDE:

1. POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM. This system removes cylinder blow-by gases from the engine crankcase and routes them into the combustion chambers to be burned rather than allowing them to escape into the atmosphere.

2. EXHAUST MODIFIER SYSTEMS. This group includes air injection units, thermal reactors, and catalytic converters. All are designed to convert carbon monoxide (CO) and hydrocarbon gases (HC) to carbon dioxide. This occurs after the pollutants have left the engine combustion chambers.

3. EXHAUST GAS RECIRCULATION (EGR) SYSTEM. This system is designed to control nitrogen oxides (NOx) emissions. This is accomplished by recirculating a controlled amount of exhaust gas into the combustion chambers to reduce peak burning temperatures.

4. EVAPORATIVE CONTROL SYSTEM. This system traps fumes that evaporate from the fuel tank and carburetor. These fumes are then routed into the engine to be burned rather than allowing them to escape into the atmosphere.

5. SPECIAL EMISSION CONTROL DEVICES. These devices are designed to assist the basic emission control systems. Special emission control devices include orifice spark advance control, speed control switch, thermostatic air cleaner, pre-heat tube, transmission controlled spark, throttle solenoid control, etc.

Department of Environmental Quality
Vehicle Inspection Program
Portland, Oregon
229-6235

DEQ/AQ-706 (Rev. 11/77)

VIP 77318

(Over)

POLLUTION CONTROL EQUIPMENT

FEDERAL REQUIREMENTS: New car manufacturers must certify that the vehicle models they sell in the United States meet Federal air pollution control standards. The manufacturers may design their vehicles any way they choose, so long as the air pollution produced by the vehicle model meets the standards.

Vehicles to be certified must be tested using federal procedures designed to represent urban driving. Vehicles are tested on a dynamometer for about 25 minutes, during which the vehicle is cold started, idles, accelerates, cruises, and decelerates. The exhaust is caught in a bag and then measured to determine the weight of air pollution produced. The test is repeated to determine hot start emissions.

To determine if the controls used by the manufacturer will continue to properly operate over a period of time, federal procedures require that vehicles be driven for 50,000 miles with only specified maintenance allowed. Full emission tests are made every 4,000 miles on these vehicles.

STATE REQUIREMENTS: The emission control tests used by the state are much simpler than the federal certification tests. The state tests detect high pollution vehicles based upon their original emission control design. The state emission control tests do not certify pollution control equipment or systems. State law does prohibit disconnection or alteration of factory-installed motor vehicle air pollution control devices or systems.

OREGON REVISED STATUTE 483.825

483.825. DISCONNECTION OR ALTERATION OF FACTORY-INSTALLED MOTOR VEHICLE AIR POLLUTION CONTROL DEVICE OR SYSTEM PROHIBITED.

(1) It shall be unlawful for any person to disconnect or permit to be disconnected a factory-installed motor vehicle air pollution control device or a factory-installed system, as defined in ORS 468.360, nor shall any person knowingly and willfully permit such device or factory-installed system to become or remain inoperative.

(2) It shall be unlawful for any person to modify or alter a certified system or a factory-installed system, as defined in ORS 468.360, in a manner which decreases its efficiency or effectiveness in the control of air pollution.

(3) (a) The provisions of subsections (1) and (2) of this section do not apply when factory-installed motor vehicle air pollution control equipment, systems, or devices are disconnected for the purpose of conversion to gaseous fuels.

(b) As used in this subsection, "gaseous fuels" includes, but is not limited to, liquefied petroleum gases and natural gases in liquefied or gaseous form.

(4) The provisions of subsections (1) and (2) of this section are not intended to prohibit the use of replacement or conversion components in a certified or factory-installed system, if the components do not significantly affect the efficiency or effectiveness of the system in controlling air pollution.

(Over)

DEQ/AQ-706 VIP 77201

OREGON -- LIGHT-DUTY VEHICLE TESTING SUMMARY

DEPARTMENT OF ENVIRONMENTAL QUALITY
VEHICLE INSPECTION PROGRAM
DAILY TESTING SUMMARY - LIGHT DUTY VEHICLES

LOCATION: ______________________

DATE: ______________________

	PASS			REASON FOR NONCOMPLIANCE					
		HC	CO	BOTH	SMOKE	IDLE	OIL	DISC	TOTAL
Pre 68									
Total									
68-69									
Total									
70-71									
Total									
72-74									
Total									
75 Plus									
Total									
G.TOTAL									across
									down

______ Total Light and Heavy Duty
______ Total Certificates
______ Total Money
______ Total Pass
______ Truck Certs Only
______ Noise Tests
______ Over-Short
______ Deposit Slip Number
______ Deposit Slip Number

Absent:	Reason:	From-To:

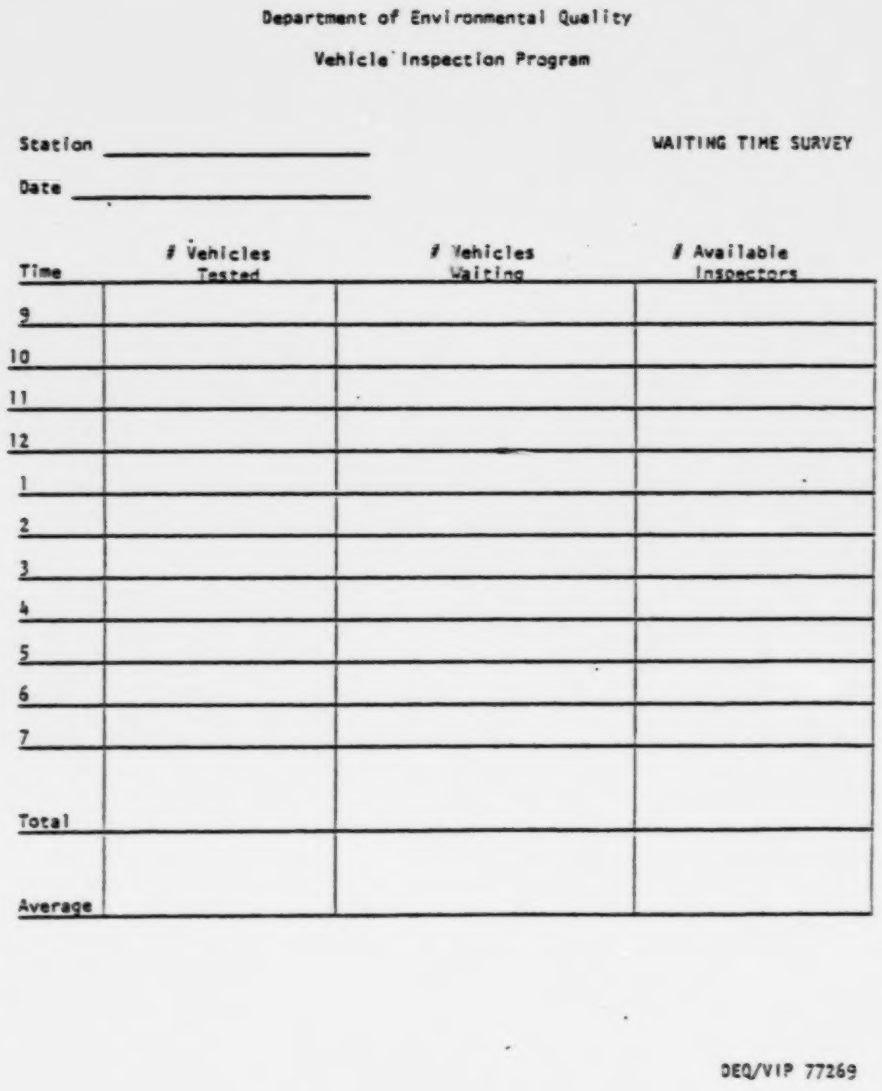
Overtime:	Reason	From To:

Notes: ______________________________

Summary Prepared By: ______________

Summary Approved By: ______________
(Signatures)

OREGON -- WAITING TIME SURVEY



Department of Environmental Quality

Vehicle Inspection Program

Station ____________________

Date ____________________

WAITING TIME SURVEY

Time	# Vehicles Tested	# Vehicles Waiting	# Available Inspectors
9			
10			
11			
12			
1			
2			
3			
4			
5			
6			
7			
Total			
Average			

DEQ/VIP 77269

OREGON -- HEAVY-DUTY VEHICLE TESTING SUMMARY

DEPARTMENT OF ENVIRONMENTAL QUALITY
VEHICLE INSPECTION PROGRAM
DAILY TESTING SUMMARY

HEAVY DUTY VEHICLES

Location: ______________________
Date: ______________________

	PASS	FAIL			2500	- - - O T H E R - - - - - - -				
		HC	CO	Both	CO	Smoke	Idle	Dilu.	Disc.	TOTAL
Pre'70										
Total										
70-'73										
Total										
74+										
Total										
Grand Total										Across
										Down

_______________ Total H.D. Certificates Sold

_______________ Deposit Slip Number

_______________ Deposit Bag Number

Notes:

Summary Prepared By:

____
Signature

Summary Approved By:

____
Signature

DEQ/AQ-743-8/77
VIP 77152

OREGON -- SAMPLE CUMULATIVE ACTIVITY REPORT

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
VEHICLE INSPECTION PROGRAM

Activity Summary for July, 1979 - October, 1979

EMISSION INSPECTION TESTS	
LIGHT DUTY	79,189
HEAVY DUTY	3,486
TOTAL	82,675
CERTIFICATES OF COMPLIANCE ISSUED	47,490

COMPLIANCE CRITERIA APPLIED:
OAR Chapter 340, Section 24-330 Mandatory Light-Duty
Motor Vehicles Idle Emission Standards

Emission Inspection Tests

Pass Emission Test	47,003 = 59%
Tests Failed for Carbon Monoxide (CO)	11,086 = 14%
Tests Failed for Hydrocarbons (HC)	6,223 = 8%
Tests Failed for Both HC & CO	6,266 = 8%
Tests Failed for Emission Equipment Disconnects	4,086 = 5%
Tests Failed for Other Causes (i.e., smoke, dilution, idle RPM)	4,525 = 6%

PRE-CATALYST VEHICLE TESTS

Number of Tests	33,713	=	43% of all Tests
Percentage Pass			51%

1975 and Newer Vehicle Tests

Number of Tests	45,476	=	57% of all Tests
Percentage Pass			65%

VPAS (rev.10/79)—VA0013.B VIP 309

OREGON -- SAMPLE MONTHLY ACTIVITY REPORT

DEPARTMENT OF ENVIRONMENTAL QUALITY
VEHICLE INSPECTION PROGRAM
522 Southwest Fifth Avenue
Portland, Oregon

Activity Report for October 1979

EMISSION INSPECTION TESTS

Light Duty	20,458
Heavy Duty	856
Totals	21,214

CERTIFICATES OF COMPLIANCE ISSUED Light and Heavy Duty 12,309

COMPLIANCE CRITERIA APPLIED:
OAR Chapter 340, Section 24-330 Mandatory Light-Duty
Motor Vehicles Idle-Emission Standards

Emission Inspection Tests

Pass Emission Test	12,145 = 59%
Tests Failed for Carbon Monoxide (CO)	2,836 = 14%
Tests Failed for Hydrocarbons (HC)	1,605 = 8%
Tests Failed for Both HC & CO	1,581 = 8%
Tests Failed for Emission Equipment Disconnects	1,014 = 5%
Tests Failed for Other Causes (i.e., smoke, dilution, idle RPM)	1,277 = 6%

Pre-Catalyst Vehicle Tests

Number of Tests	8,682 = 42% of all Tests
Percentage Pass	52%

1975 and Newer Vehicle Tests

Number of Tests	11,776 = 58% of all Tests
Percentage Pass	65%

Total Light and Heavy Duty Emission Inspection Test by Location

Powell	-	4,241
Tigard	-	4,176
Milwaukie	-	2,787
Northeast	-	2,833
Rockwood	-	2,503
Hillsboro	-	2,571
Northwest	-	2,203

VMAR (rev.10/79)—VA0013.A VIP 309

OREGON -- SAMPLE HEAVY-DUTY VEHICLE TEST SUMMARY

DEPARTMENT OF ENVIRONMENTAL QUALITY
VEHICLE INSPECTION PROGRAM
522 Southwest Fifth Avenue
Portland, Oregon

Heavy-Duty Gasoline Vehicle Test Summary
October 1979

EMISSION INSPECTION TESTS	856
OVERALL PERCENTAGE PASS	58.9%

Pre-1970 Trucks (260)

Pass Emission Test	56.9%
Tests Failed for Carbon Monoxide (CO)	10.0%
Tests Failed for Hydrocarbons (HC)	13.0%
Tests Failed for Both HC & CO	4.2%
Tests Failed for CO @ 2500 rpm	10.0%
Tests Failed for Other Causes	5.7%

1970-1973 Trucks (198)

Pass Emission Test	55.5%
Tests Failed for Carbon Monoxide (CO)	13.6%
Tests Failed for Hydrocarbons (HC)	12.6%
Tests Failed for Both HC and CO	6.0%
Tests Failed for CO @ 2500 rpm	6.0%
Tests Failed for Emission Equipment Disconnects	2.0%
Tests Failed for Other Causes	4.0%

1974 and Later Trucks (398)

Pass Emission Test	62.0%
Tests Failed for Carbon Monoxide (CO)	12.5%
Tests Failed for Hydrocarbons (HC)	13.3%
Tests Failed for Both HC and CO	3.2%
Tests Failed for CO @ 2500 rpm	2.7%
Tests Failed for Emission Equipment Disconnects	2.7%
Tests Failed for Other Causes	3.2%

VA0013
VMHD (rev.10/79)—(VA0013) VIP 309

OREGON -- WAITING TIME SURVEY

Department of Environmental Quality
Vehicle Inspection Program

Waiting Time Survey
Minutes Average Waiting Time

September 1979

Date	Station						
	Powell	Northwest	Northeast	Tigard	Milwaukie	Rockwood	Hillsboro
9/4	8.7	1.5	2.8	10.9	1.9	4.1	3.4
9/6	2.8	1.3	0.3	7.2	0.0	1.2	0.9
9/8	4.4	1.2	2.2	5.3	1.2	0.9	1.2
9/11	16.6	7.5	6.6	26.2	5.0	4.1	7.5
9/20	3.7	2.8	3.1	7.5	2.8	3.1	3.1
9/28	3.4	4.4	4.1	11.2	3.1	0.6	2.5
9/29	4.7	1.2	2.5	1.6	1.2	0.9	2.8
Average	6.3	2.8	3.1	10.0	2.2	2.1	3.1

VA2047

WTS (6/79)

DEPARTMENT OF ENVIRONMENTAL QUALITY
VEHICLE INSPECTION PROGRAM
522 S.W. Fifth Avenue
Portland, Oregon

Cost of Repair Survey
(1,655 Responses)

Summary for September , 1979

Repairs and Adjustments Performed for Retest

A/F Mixture Adjustment	34.2%
Idle Speed Adjustment	19.6%
Air Cleaner Replacement	6.6%
Choke Repair	2.3%
Carburetion Repair	10.8%
Dwell/Timing Adjustment	8.4%
Spark Plug Replacement	5.3%
Spark Plug Wire Replacement	1.6%
Distributor Repair	2.9%
Vacuum Hose Replacement	2.5%
Other Adjustments or Repairs	5.8%

Passing Retest After Repair 76.9%

Reported Cost of Repair

0 - 5$	36.4%
$5.01 - $10.00	28.1%
$10.01 - $20.00	18.7%
$20.01 - $30.00	5.1%
$30.01 - $50.00	5.7%
$50.01 - $75.00	1.3%
Over $75.00	4.7%

VA2047.A
VCRS (5/79)

The information used in these surveys was entered on the bottom of the Diagnostic Suggestion form (see page G-4), which was then returned to the DEQ for tabulation. This survey is no longer being conducted, according to DEQ officials.

OREGON -- REPAIR COST SURVEY

DEPARTMENT OF ENVIRONMENTAL QUALITY
VEHICLE INSPECTION PROGRAM

Cost of Repair Survey
(1,628 Responses)

Summary for April, 1978

Repairs and Adjustments Performed for Retest	
A/F Misture Adjustment	50.0
Idle Speed Adjustment	17.1
Air Cleaner Replacement	10.0
Choke Repair	3.3
Carburetion Repair	11.3
Dwell/Timing Adjustment	9.6
Spark Plug Replacement	8.1
Spark Plug Wire Replacement	3.7
Distributor Repair	3.2
Vacuum Hose Replacement	1.8
Other Adjustments or Repairs	4.0
Passing Retest After Repair	93.3
Reported Cost of Repair	
0 - $5	53.4
$5.01 - $10	21.2
$10.01 - $20	6.7
$20.01 - $30	2.1
$30.01 - $50	2.2
$50.01 - $75	2.2
Over $75	2.7

DEQ/VIP 78143

OREGON -- STATION SUPERVISORS' CALIBRATION LOG

DEPARTMENT OF ENVIRONMENTAL QUALITY - VEHICLE INSPECTION PROGRAM **CALIBRATION LOG OEA-75**

Date ______________ Station ______________ Set Points: CO ______________

Propane Factor __________ ..... X ..... Tank Value ______________ .... = ... HC ______________

Unit ______________ Gas Bottle __________ Date ______________ CO_2 ______________

HOURLY READINGS

TIME	DATE	ZERO			OPTICAL			GAS			ADJ BY	TANK PRESS
		CO	HC	CO_2	CO	HC	CO_2	CO	HC	CO_2		
8												
9												
10												
11												
12 Noon												
1												
2												
3												
4												
5												
6												
7												
8												

DEQ/AQ-723 VIP 79194

OREGON -- ANALYZER CALIBRATION SCHEDULE

STATE OF OREGON
Department of Environmental Quality

VEHICLE INSPECTION PROGRAM	Number: 702
Operating Policies and Procedures	Supersedes:
Originating Section: Engineering	Page 1 of 1

Subject OEA '75 Exhaust Gas Analyzer Calibration Schedule

PURPOSE: To establish the schedule to be followed for the calibration of exhaust gas analyzers.

REFERENCE: 701

Policy

All exhaust gas analyzers are to be gaseous and optical calibrated on the following schedule.

8:00 a.m.*	Calibration and recording of readings
9:00 a.m.	Calibration and recording of readings
12:00 noon	Calibration and recording of readings
3:00 p.m.	Calibration and recording of readings
6:00 p.m.**	Recording of gaseous readings only

*At beginning of testing day for Mobile Units.

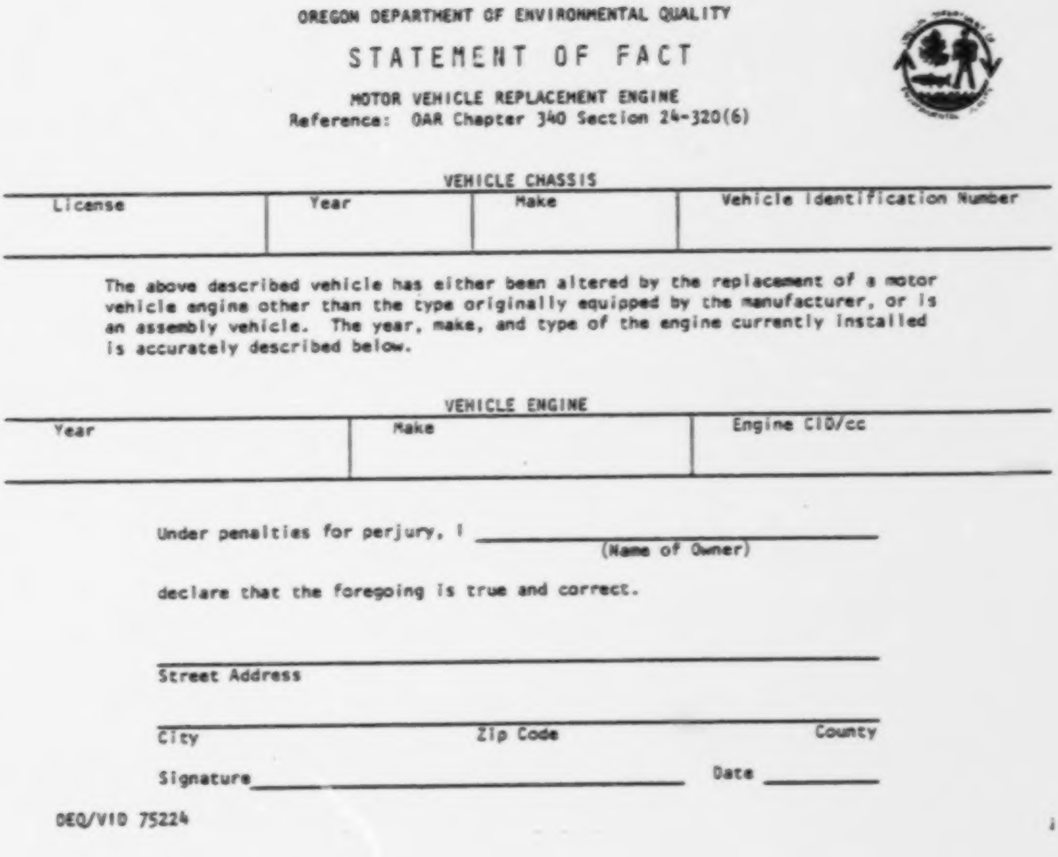
**At end of testing day for Mobile Units.

Approved

Date 16 Jun 1980

VF0442

OREGON -- CUSTOMER STATEMENT OF REPLACEMENT EQUIPMENT



OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

STATEMENT OF FACT

MOTOR VEHICLE REPLACEMENT ENGINE
Reference: OAR Chapter 340 Section 24-320(6)

VEHICLE CHASSIS

License	Year	Make	Vehicle Identification Number

The above described vehicle has either been altered by the replacement of a motor vehicle engine other than the type originally equipped by the manufacturer, or is an assembly vehicle. The year, make, and type of the engine currently installed is accurately described below.

VEHICLE ENGINE

Year	Make	Engine CID/cc

Under penalties for perjury, I ______________________________
(Name of Owner)

declare that the foregoing is true and correct.

____
Street Address

____
City Zip Code County

Signature______________________________ Date __________

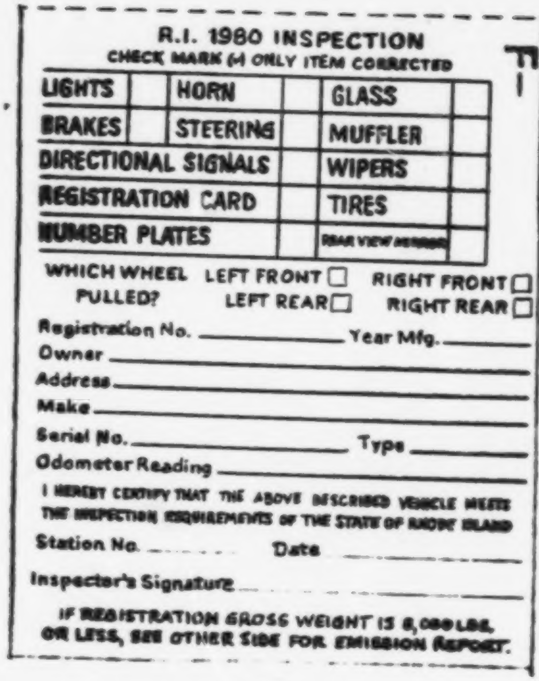
DEQ/VID 75224

APPENDIX H

LIST OF RHODE ISLAND APPENDIX MATERIAL

	Page
Inspection Form	H-2
Roadside Check Ticket	H-3
Roadside and Challenge Check Form	H-4
Inspection Station Report	H-5
Analyzer Calibration Check Form	H-6
Random Road Checks (Emissions)	H-7
Inspection News - December 20, 1979	H-9
Minimum Requirements for Inspection Stations	H-10
Analyzer Accreditation	H-14
List of Approved Analyzers	H-15
Application for Appointment as an Official Inspection Station	H-16

RHODE ISLAND INSPECTION FORM



R.I. 1980 INSPECTION
CHECK MARK (✓) ONLY ITEM CORRECTED

LIGHTS		HORN		GLASS	
BRAKES		STEERING		MUFFLER	
DIRECTIONAL SIGNALS				WIPERS	
REGISTRATION CARD				TIRES	
NUMBER PLATES				REAR VIEW MIRROR	

WHICH WHEEL PULLED? LEFT FRONT ☐ RIGHT FRONT ☐ LEFT REAR ☐ RIGHT REAR ☐

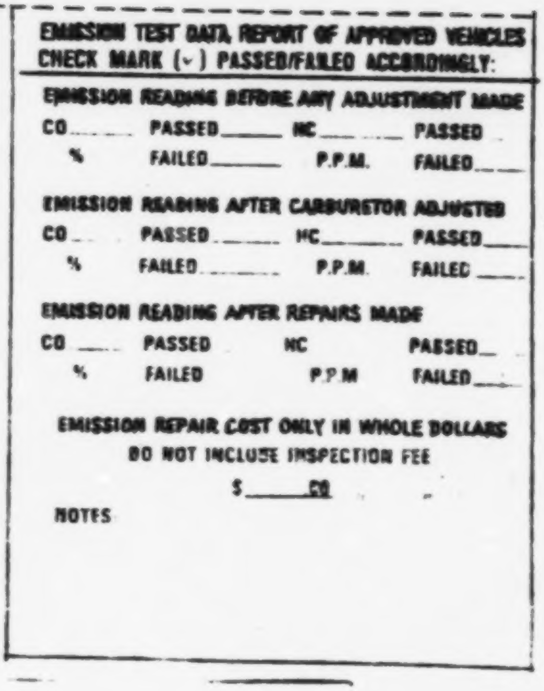
Registration No. ____________ Year Mfg. ________
Owner ____________________________
Address ____________________________
Make ____________________________
Serial No. ____________ Type ________
Odometer Reading ____________________

I HEREBY CERTIFY THAT THE ABOVE DESCRIBED VEHICLE MEETS THE INSPECTION REQUIREMENTS OF THE STATE OF RHODE ISLAND

Station No. ________ Date ____________
Inspector's Signature ____________________

IF REGISTRATION GROSS WEIGHT IS 8,000 LBS. OR LESS, SEE OTHER SIDE FOR EMISSION REPORT.

FRONT



EMISSION TEST DATA REPORT OF APPROVED VEHICLES
CHECK MARK (✓) PASSED/FAILED ACCORDINGLY:

EMISSION READING BEFORE ANY ADJUSTMENT MADE
CO ______ PASSED ______ HC ______ PASSED ____
% FAILED ______ P.P.M. FAILED ____

EMISSION READING AFTER CARBURETOR ADJUSTED
CO ______ PASSED ______ HC ______ PASSED ____
% FAILED ______ P.P.M. FAILED ____

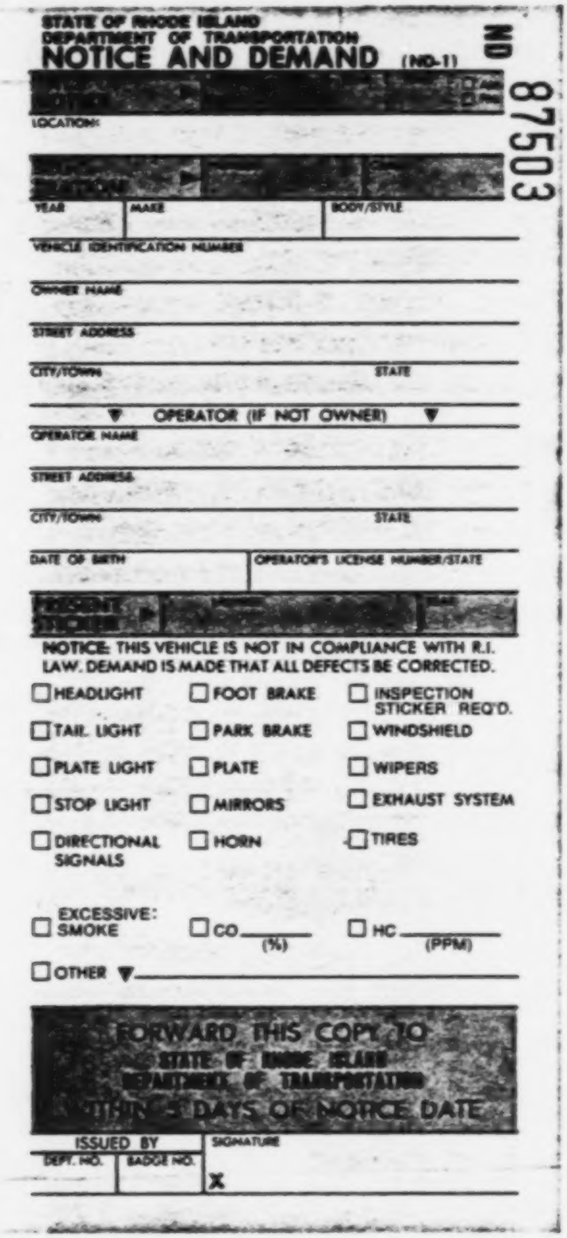
EMISSION READING AFTER REPAIRS MADE
CO ______ PASSED HC PASSED ____
% FAILED P.P.M FAILED ____

EMISSION REPAIR COST ONLY IN WHOLE DOLLARS
DO NOT INCLUDE INSPECTION FEE
$______.00

NOTES

REVERSE

RHODE ISLAND -- ROADSIDE CHECK TICKET



STATE OF RHODE ISLAND
DEPARTMENT OF TRANSPORTATION
NOTICE AND DEMAND (ND-1)

ND 87503

[illegible] ☐ AM ☐ PM

LOCATION:

[illegible]

YEAR

MAKE

BODY/STYLE

VEHICLE IDENTIFICATION NUMBER

OWNER NAME

STREET ADDRESS

CITY/TOWN

STATE

▼ OPERATOR (IF NOT OWNER) ▼

OPERATOR NAME

STREET ADDRESS

CITY/TOWN

STATE

DATE OF BIRTH

OPERATOR'S LICENSE NUMBER/STATE

PRESENT STICKER ▶ [illegible]

NOTICE: THIS VEHICLE IS NOT IN COMPLIANCE WITH R.I. LAW. DEMAND IS MADE THAT ALL DEFECTS BE CORRECTED.

☐ HEADLIGHT
☐ TAIL LIGHT
☐ PLATE LIGHT
☐ STOP LIGHT
☐ DIRECTIONAL SIGNALS

☐ FOOT BRAKE
☐ PARK BRAKE
☐ PLATE
☐ MIRRORS
☐ HORN

☐ INSPECTION STICKER REQ'D.
☐ WINDSHIELD
☐ WIPERS
☐ EXHAUST SYSTEM
☐ TIRES

EXCESSIVE:
☐ SMOKE
☐ CO ________ (%)
☐ HC ________ (PPM)

☐ OTHER ▼ ________________________________

FORWARD THIS COPY TO
STATE OF RHODE ISLAND
DEPARTMENT OF TRANSPORTATION
WITHIN [illegible] DAYS OF NOTICE DATE

ISSUED BY

DEPT. NO.

BADGE NO.

SIGNATURE

X

RHODE ISLAND -- ROADSIDE AND CHALLENGE CHECK FORM

DATE ____________________

WEATHER ____________________

TEMPERATURE ____________________

VEHICLE REGISTRATION NUMBER	TYPE	MAKE	YEAR	MODEL	NO. OF CYL.	H.C.	C.O.	PASS - FAIL	STICKER MONTH

MAKE

1 = AMC 4 = GM
2 = Chy 5 = IMP
3 = FORD 6 = OTH

MODEL CODES

1 = Subcompact
2 = Compact
3 = Inermediate
4 = Full size
5 = Luxury
6 = Truck/Van

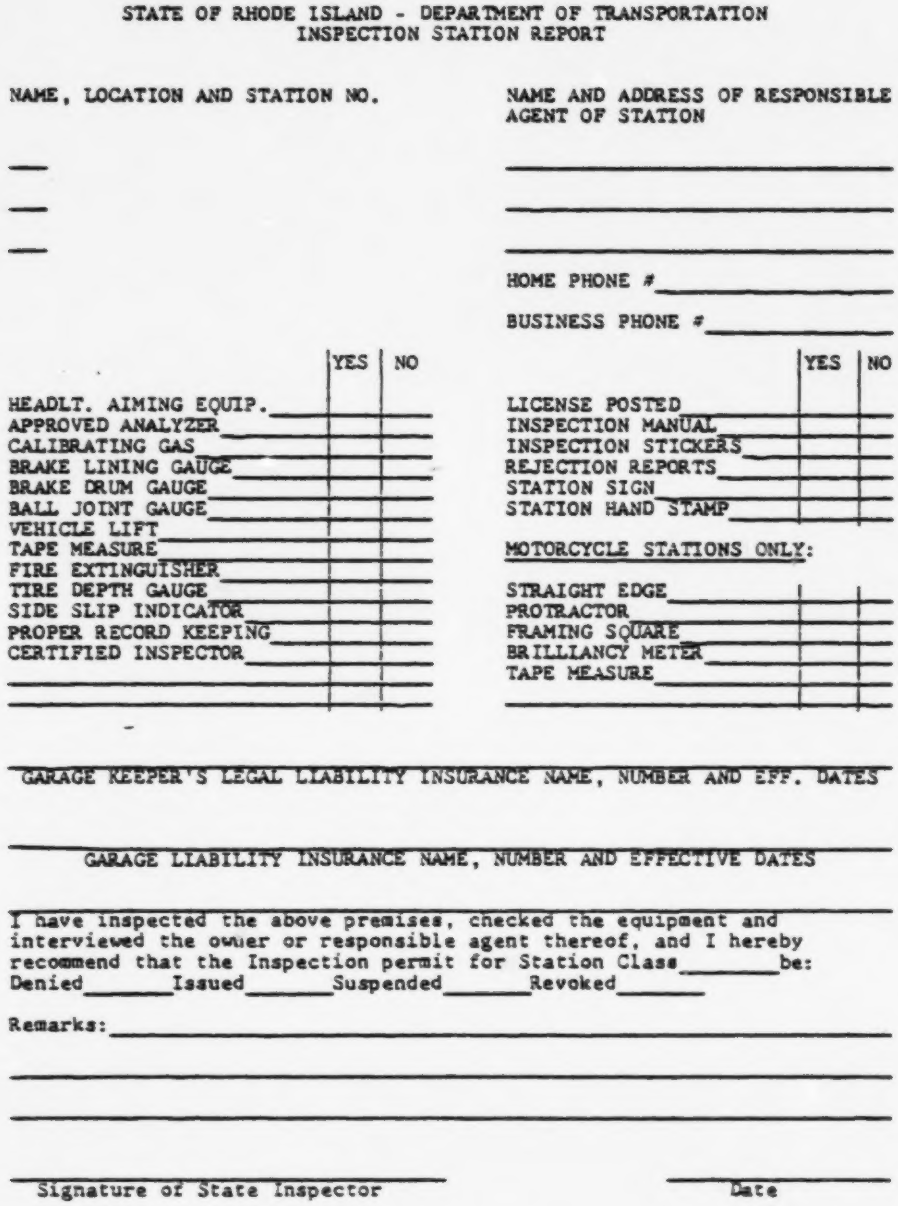
NO. OF CYL.

D = Diesel
R = Rotary
O = Other

EMISSION STANDARDS

VEHICLE YR.	HC	CO
67 or before	1600	10.0
1968-1969	0800	08.0
1970-1974	0600	06.0
1975 and later	0300	03 0

RHODE ISLAND -- INSPECTION STATION REPORT



STATE OF RHODE ISLAND - DEPARTMENT OF TRANSPORTATION
INSPECTION STATION REPORT

NAME, LOCATION AND STATION NO.

NAME AND ADDRESS OF RESPONSIBLE AGENT OF STATION

HOME PHONE #____________

BUSINESS PHONE #____________

	YES	NO
HEADLT. AIMING EQUIP.		
APPROVED ANALYZER		
CALIBRATING GAS		
BRAKE LINING GAUGE		
BRAKE DRUM GAUGE		
BALL JOINT GAUGE		
VEHICLE LIFT		
TAPE MEASURE		
FIRE EXTINGUISHER		
TIRE DEPTH GAUGE		
SIDE SLIP INDICATOR		
PROPER RECORD KEEPING		
CERTIFIED INSPECTOR		

	YES	NO
LICENSE POSTED		
INSPECTION MANUAL		
INSPECTION STICKERS		
REJECTION REPORTS		
STATION SIGN		
STATION HAND STAMP		

MOTORCYCLE STATIONS ONLY:

	YES	NO
STRAIGHT EDGE		
PROTRACTOR		
FRAMING SQUARE		
BRILLIANCY METER		
TAPE MEASURE		

GARAGE KEEPER'S LEGAL LIABILITY INSURANCE NAME, NUMBER AND EFF. DATES

GARAGE LIABILITY INSURANCE NAME, NUMBER AND EFFECTIVE DATES

I have inspected the above premises, checked the equipment and interviewed the owner or responsible agent thereof, and I hereby recommend that the Inspection permit for Station Class______be:
Denied______Issued______Suspended______Revoked______

Remarks:________________________

Signature of State Inspector

Date

RHODE ISLAND -- ANALYZER CALIBRATION CHECK FORM

STATE OF RHODE ISLAND DEPARTMENT OF TRANSPORTATION--EXHAUST ANALYZER CALIBRATION CHECKS
(KEEP THIS REPORT WITH OFFICIAL INSPECTION MANUAL)

(PRINT OR TYPE)

NAME OF STATION:__

HC/CO ANALYZER MANUFACTURER:____________________

LOCATION:_______

MODEL NUMBER:____________ SERIAL NO.___________ FACTOR NO.________

MAILING ADDRESS:__

STATION NO.____________ NUMBER OF ANALYZERS IN STATION:__________

DATE	CALIBRATION GAS SPECIFICATIONS HC (PPM)	CO %	METER READING CALIBRATION GAS HC (PPM)	CO %	AUTHORIZED INSPECTOR OR AGENT OF STATION SIGNATURE	NUMBER	ANALYZER APPROVED YES	NO	SAFETY TEST EQUIPMENT YES	NO	REMARKS OR CORRECTIONS MADE	STATE INSPECTOR SIGNATURE
	PPM	%	PPM	%								
	PPM	%	PPM	%								
	PPM	%	PPM	%								
	PPM	%	PPM	%								
	PPM	%	PPM	%								
	PPM	%	PPM	%								
	PPM	%	PPM	%								
	PPM	%	PPM	%								
	PPM	%	PPM	%								
	PPM	%	PPM	%								

IF TESTING EQUIPMENT UNSATISFACTORY CHECK "NO" ABOVE AND SUBMIT A WRITTEN REPORT

RANDOM ROAD CHECKS (Emissions)

In addition to the safety checks being conducted during the random road check program, State Inspectors examined vehicles for emission violations by measuring the exhaust gases at the tail pipe for both hydrocarbon (HC) and carbon monoxide (CO).

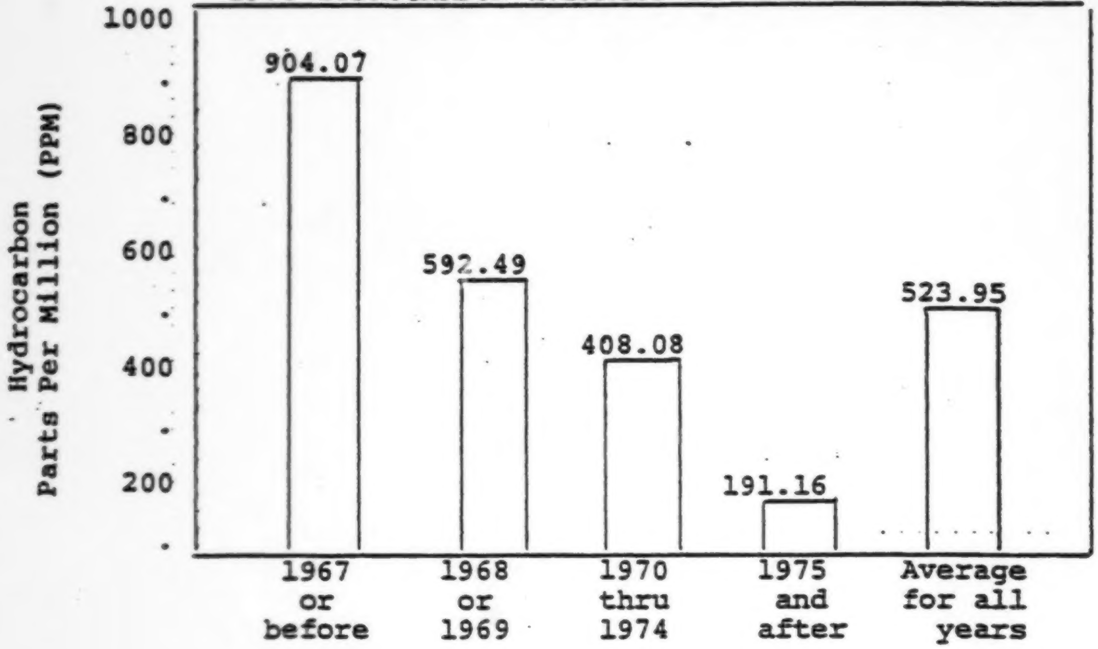
Statistical information was recorded which indicates that vehicles inspected for emission violations demonstrated a rejection rate of 26.37%. Many of the vehicles that were inspected had the benefit of a garage inspection and may have had repairs made during the voluntary period. A total of 1,054 vehicles were inspected producing the following results.

VEHICLE MODEL YEAR

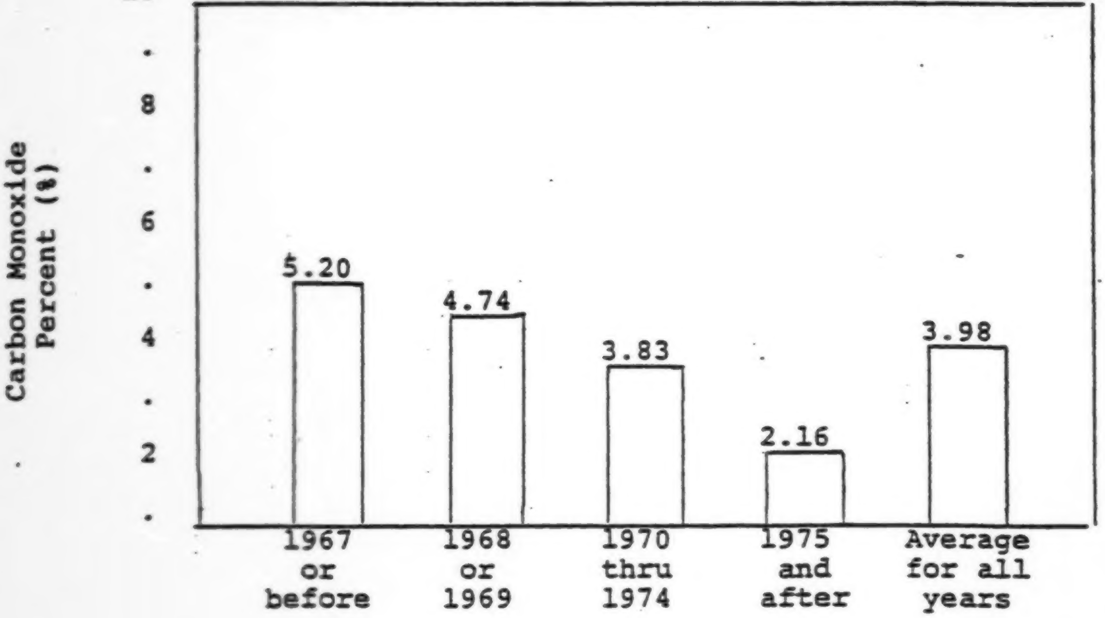
	1967 or before	1968 1969	1970 1974	1975 and after	Summary All years
Vehicles Tested	149	178	454	273	1054
Passed Both (%)	77.19	73.03	70.27	77.66	73.63
Rejected (%)	22.81	26.97	29.73	22.34	26.37
Fail Both (%)	1.34	6.18	5.51	7.33	5.50
Fail HC only (%)	17.45	15.17	12.55	3.66	11.39
Fail CO only (%)	4.02	5.62	11.67	11.35	9.48
Average HC (PPM)	904.07	592.49	408.08	191.16	523.95
Average CO (%)	5.20	4.74	3.83	2.16	3.98

RANDOM ROAD CHECKS (Emissions) (Cont.)

1978 HYDROCARBON AVERAGES BY VEHICLE MODEL YEAR



1978 CARBON MONOXIDE AVERAGES BY VEHICLE MODEL YEAR



STATE OF RHODE ISLAND

DEPT. OF TRANSPORTATION DIVISION OF MOTOR VEHICLES

INSPECTION NEWS

December 20, 1979

To: All Inspection Stations

From: Alfred Massarone, Chief
Motor Vehicle Safety and
Emission Control Division

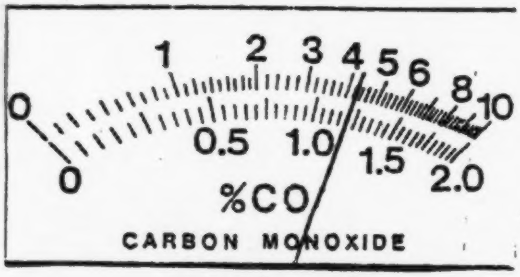
Please read carefully:

In our continuing efforts to improve the Rhode Island inspection program and in accordance with inspection regulation 1.2 concerning station reports, all inspection stations are hereby required as of January 1, 1980, to issue approval stickers in strict numerical order, starting with the lowest number assigned to the station and to record additional emission information for those vehicles that are required to be tested for emissions.

The 1980 inspection report that accompanies each inspection approval sticker has been re-designed so that you can record emission inspection information on the back side of the report that can only be obtained at the time of inspection. This information MUST BE RECORDED ACCURATELY on the inspection report when the vehicle is approved.

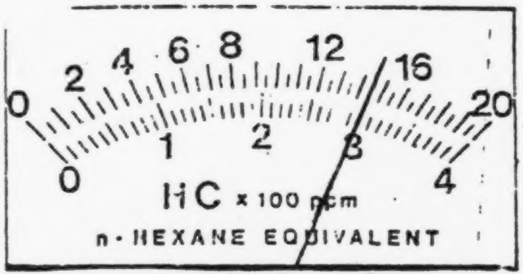
From time to time, State inspectors will examine these records and extract certain safety and emission information that will be computerized and used to determine the effectiveness of the program.

Record the appropriate number that is indicated by the line that is "closest" to the dial indicator as shown by the following examples:



on high scale

Record this type of reading in the CO___space as 4.2



on high scale

Record this type of reading in the HC___space as 1450.

RHODE ISLAND -- MINIMUM REQUIREMENTS FOR INSPECTION STATIONS

STATE OF RHODE ISLAND
DEPARTMENT OF TRANSPORTATION

2. MINIMUM REQUIREMENTS FOR APPROVED INSPECTION STATIONS

In accepting your appointment as an official inspection station, you are responsible for and required to maintain qualified personnel, space, tools, approved testing equipment, liability insurance, inspection reports and stickers, rejection reports and a copy of all the rules and regulations. Any violation of these requirements will be cause for immediate suspension of your inspection permit until all requirements have been met and approved.

The size requirements of each inspection lane or bay will be approved based on the type of headlight aiming equipment being used and the size of the vehicles required to be inspected.

Inspection stations will be issued permits for a 12-month period and will be allowed to inspect only those vehicles classified as follows:

CLASS A:	All motor vehicles and all trailers registered with a gross weight of more than 1,000 pounds except motorcycles.
CLASS C:	All motor vehicles registered with a gross weight of more than 8,000 pounds, and all trailers registered with a gross weight of more than 1,000 pounds.
CLASS A & C:	The inspection lane or bay shall be at least 65 feet long by 13 feet wide with an entrance door at least 11 feet in height. This is to allow for a 40 foot long vehicle plus 25 feet for the headlamp aiming board. However, if mechanical aimers are used, a lane or bay 45 feet long will be accepted. Certain vehicles such as cement mixers and box trailers etc., will be allowed to be checked outside the inspection lane if the vehicle cannot fit into the Class A or C inspection lane or bay providing that the station has mechanical headlamp aimers calibrated for the outside area being used.
CLASS B:	All motor vehicles that are registered with a gross weight of 8,000 pounds or less, except trailers and motorcycles. The inspection lane or bay shall be at least 45 feet long by 13 feet wide. This is to allow for a 20 foot long vehicle plus an additional 25 feet for a headlamp aiming board. However, if mechanical aimers are used, a lane or bay 25 feet long will be accepted.
CLASS F:	Limited to 10 or more vehicles registered, used and serviced by a business. The space and equipment requirements of these inspection lanes or bays will be determined according to the type vehicles registered by the fleet operator.

2. MINIMUM REQUIREMENTS FOR APPROVED INSPECTION STATIONS (cont.)

CLASS M: Motorcycles only. The inspection lane or bay shall be at least 30 feet long by 6 feet wide. This is to allow for a 5 foot space for the vehicle plus an additional 25 feet for the headlamp aiming board. However, if a mechanical aimer is used, a lane 15 feet long will be accepted.

Additional motorcycle requirements may be found in Section 2.2.

2.1 INSPECTION LANE OR BAY

Every appointed inspection station will be required to have at least one approved inspection lane or bay containing all the required headlamp aiming equipment. It is to be available for the purpose of vehicle inspection during the entire calendar year.

All inspection lanes or bays shall be enclosed in a building with a smooth, flat substantial floor on which the vehicle will stand. The headlamp aiming equipment must be calibrated according to the level of the floor of such lane or bay.

2.1.1 CERTIFIED INSPECTOR

Each station must have at least one certified inspector available during the normal inspection hours of the station.

It is required that each station owner select certified inspectors who are at least eighteen (18) years of age with a valid driver's license who have successfully completed a satisfactory training course in auto safety and emission inspection that has been approved by the Department of Transportation. The certified inspector must be able to demonstrate to the Department of Transportation that he is capable of operating and calibrating all required testing equipment and capable of inspecting vehicles.

2.1.2 INSPECTION STATION SIGN

Each inspection station must be suitably identified by a sign that is visible at or near the normal main entrance to the establishment. The sign must be in letters and numbers at least 3" in height and ½" in width and must bear the words, "Rhode Island Official Inspection Station" along with the station number that has been assigned by the State.

2.1.3 INSPECTION STATION HAND STAMP

A rubber stamp with the station number, name and address approximately 2½" long by 3/4" wide is required.

2.1.4 HEADLAMP AIMING EQUIPMENT

The headlamp testing equipment may be a headlight testing target board, a mechanical headlamp tester, optical aiming devices or combination photoelectric and optical headlight testing machines. Each station must be equipped with sufficient equipment to aim round or rectangular headlamps for any motor vehicle presented for inspection.

The headlamp aiming equipment must be calibrated according to the level of the floor of the inspection lane or bay.

2.1.5 TIRE DEPTH GAUGE

The tire depth gauge must be graduated in 1/32nds of an inch.

2.1.6 BRAKE LINING GAUGE

A gauge suitable to measure the thickness of brake lining material when mounted (either bonded or riveted). The gauge must be graduated in 1/64ths of an inch.

2.1.7 BRAKE DRUM GAUGE

The brake drum inspection gauge or micrometer must be graduated in thousandths of an inch.

2.1.8 BRAKE DISC GAUGE

A brake disc inspection gauge or micrometer type dial indicator capable of reading measurements in one-thousandths inch increments, to determine the thickness of the brake rotor disc.

2.1.9 BALL JOINT GAUGE

A ball joint gauge or similar device which is capable of measuring the vertical and horizontal movement of a wheel or ball joint in order to determine the play or movement of the ball joint in thousandths of an inch.

This unit must be a micrometer-type dial indicator instrument capable of reading measurements in one-thousandths inch increments.

2.1.10 WHEEL ALIGNMENT TESTING EQUIPMENT

Must include side slip indicator, capable of measuring side slip or scuff at 30 feet per mile.

2.1.11 TAPE MEASURE

The tape measure must be at least 15 feet long and distinctively marked at: 24" - 80" and 14 feet.

2.1.12 JACKS AND LIFTS

At least one automatic vehicle lift capable of lifting at least the front end of the vehicle and one portable jack.

2.1.13 CLEAN AND FREE OF HAZARDS

Every inspection lane or bay must be free of hazards that could cause injury to persons or damage to vehicles. Hazards include, but are not limited to: open fires, exposed gasoline, paint spraying equipment, unprotected pits and slippery floors.

2.1.14 GARAGE LIABILITY INSURANCE

Each inspection station will be required to show evidence of an active GARAGE KEEPER'S LEGAL LIABILITY Insurance Policy with a minimum of $6,000 liability coverage as well as a GARAGE LIABILITY Insurance Policy meeting the minimum state limits which will afford liability coverage for the customer's vehicle while it is being tested or used in connection with the inspection of the vehicle.

2.1.15 EMISSION TESTING EQUIPMENT AND CALIBRATION GASES

Emission inspection equipment must be capable of performing an idle emission inspection of all vehicles required to be inspected for hydrocarbon in parts-per-million (PPM) and carbon monoxide in percent (% CO). The analyzer shall be of a type approved by the Director of the Department of Transportation.

Each analyzer shall be equipped with all necessary valves, hoses, and other equipment to calibrate the analyzer along with a supply of calibration gases in concentrations that meet the manufacturer's specifications for calibration of the analyzer. The calibration gases shall be certified by the gas blender to be within ±2% of the labeled concentrations attached to the gas container.

Each station will be required to gas check the calibration of each analyzer used for inspection at least once each week and record the results of the calibration check. Periodically, each certified inspector will be required to gas check the calibration of each analyzer used by actual demonstration before a State Inspector. This demonstration does not preclude any calibration check that the State may want to make.

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Transportation
OFFICE OF THE DIRECTOR
State Office Building
Providence, R.I. 02903

August 29, 1977

Dear Sir:

Enclosed is the interim accreditation procedure that has been established by the State of Rhode Island to determine what emission analyzers will be acceptable for use as part of the State's Emission Inspection Program.

Please be advised that effective September 1, 1977, interim approval will be granted to those exhaust analyzers whose manufacturers can certify in writing to the Inspection Office of the Rhode Island Department of Transportation that their exhaust analyzers can meet the following minimum requirements:

1. The analyzer must operate on 115 volts (±10% AC) 60 hertz electrical power.
2. The analyzer has been tested by a recognized testing laboratory and has met the accreditation procedures for use in the State of California.
3. The analyzer is capable of remaining in a warmed up condition ready for immediate use throughout an eight (8) hour period.
4. The analyzer has affixed to its cabinet operating instructions including calibrating procedures.

Qualified instruments will be listed by and posted in the Inspection Office of the Department of Transportation for easy reference to all of our appointed inspection stations.

Sincerely yours,

Wendall J Flanders

Wendall J. Flanders, Director
DEPARTMENT OF TRANSPORTATION

WJF:rb

RHODE ISLAND -- LIST OF APPROVED ANALYZERS

STATE OF RHODE ISLAND
DEPARTMENT OF TRANSPORTATION
MOTOR VEHICLE SAFETY AND EMISSION CONTROL DIVISION

NOVEMBER 13, 1979

The following exhaust analyzers have been granted interim approval by the Department of Transportation and are in accordance with the interim approval accreditation procedures that have been established by the State of Rhode Island for use as part of the State's Emission Inspection Program.

ALLEN TESTPRODUCTS		ROTUNDA	AMSERV	MTSE
23-360-CA	18-090-CA	23-065-CA	23-067-CA	23-066-CA
23-370-CA	18-150-CA	23-075-CA	23-077-CA	23-076-CA
23-380-CA	18-190-CA	23-085-CA	23-087-CA	23-086-CA
23-060-CA	18-250-CA	23-165-CA	23-167-CA	23-166-CA
23-070-CA		23-175-CA	23-177-CA	23-176-CA
23-080-CA	23-360	23-185-CA	23-187-CA	23-186-CA
23-160-CA	23-370	18-095-CA	18-097-CA	18-096-CA
23-170-CA	23-380	18-155-CA	18-157-CA	18-156-CA
23-190-CA		18-195-CA	18-197-CA	18-196-CA
		18-255-CA	18-297-CA	18-296-CA

APPLIED POWER

Atlas	Marquette	Rotunda
AMA-313	42-076	BRE 42-735
AEA-376	40-176	40-796
AMA-550	40-276	40-771
AMA313C	40-176 A	

BARNES ENGINEERING CO.

Barnes 1836 C
Barnes 8335 C
Clayton CSS/310
Fox 1800
Peerless 675
King 770 C

FMC CORPORATION

Rotunda	Autoscan
705 C	705 C
710 C	710 C
Also any of the 4000 IR-C series	Also any of the 4000 IR-C series

HORIBA

Mexa 300 A

D-400A-w/MEXA 300 A
GSM-300
GSM-300 A

KAL-EQUIP COMPANY

Kal-Equip Company's Model 4094D-RI
NAPA/Belkamp's Model 14-4787-RI
Poweready's Model 370-400-RI
AC-Delco's Model ST-500-RI

HAMILTON AUTOSENSE

Model 200, P/N 759400-2
Avis Rent-A-Car with analyzer 7610502
Model 130, P/N 761050-2

CHRYSLER CORPORATION

Chrysler III C
Chrysler III C with Mopar Logo
Chrysler III C with MTSE Logo
Chrysler III C with Scott Logo

Atlas AEA 370

SUN ELECTRIC CORPORATION

Sun	Atlas
IIIS	AET-330
1215 Computer II	AMA-450
2001	AMA-470
EPA-75	Rotunda - 0003
EET-910-I	Rotunda - 78-004
U-912-I	Rotunda - 78-004

BECKMAN INSTRUMENTS

Beckman 590

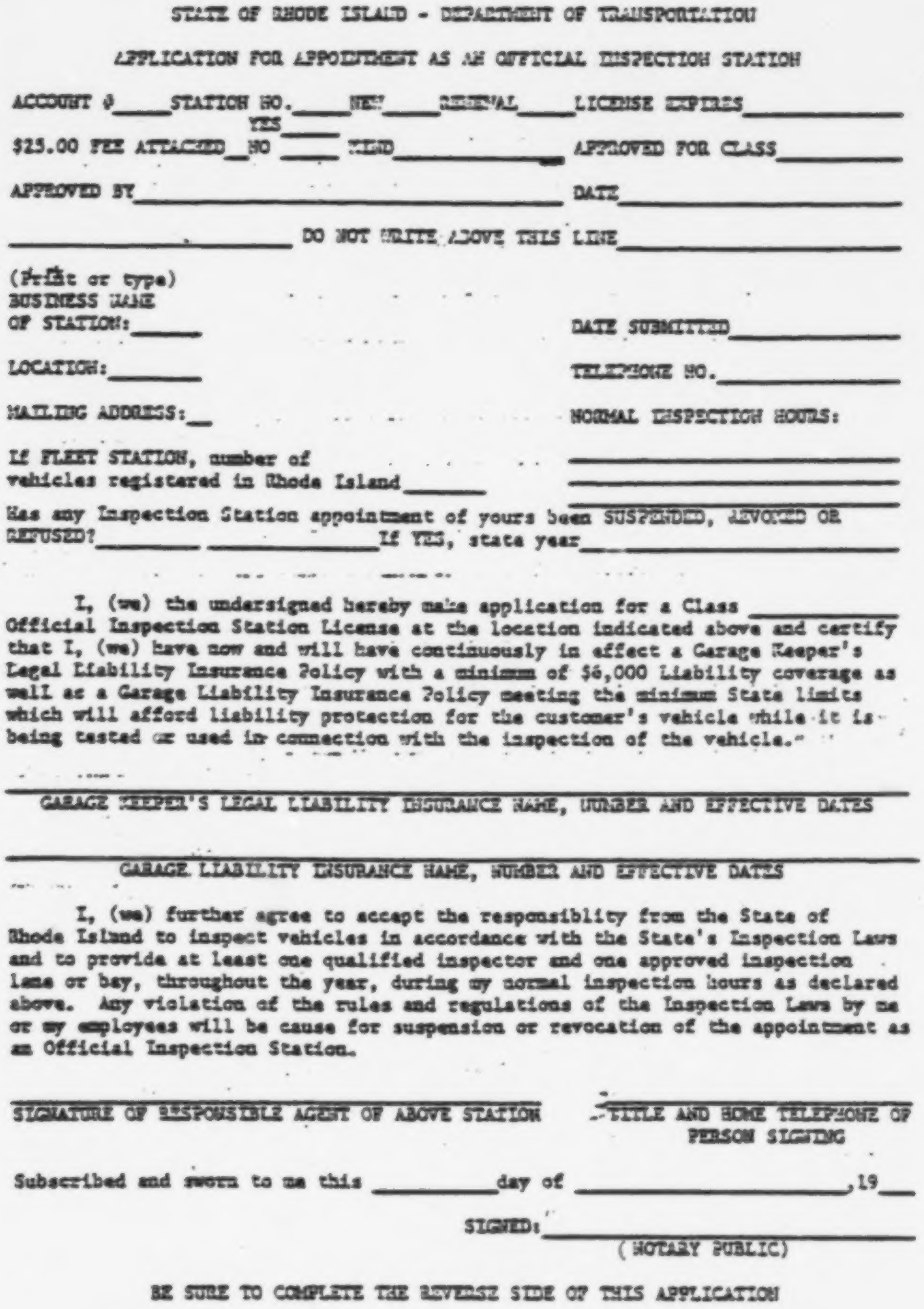
STEWART WARNER CO.

Model 3160-ACI

SNAP-ON TOOLS

MT 496 A
MT 497 A
MT 496 AS
MT 497 S

RHODE ISLAND -- APPLICATION FOR APPOINTMENT AS AN OFFICIAL INSPECTION STATION



STATE OF RHODE ISLAND - DEPARTMENT OF TRANSPORTATION

APPLICATION FOR APPOINTMENT AS AN OFFICIAL INSPECTION STATION

ACCOUNT #_____ STATION NO._____ NEW_____ RENEWAL_____ LICENSE EXPIRES____________

$25.00 FEE ATTACHED __ YES_____ NO _____ KIND____________ APPROVED FOR CLASS__________

APPROVED BY______________________________ DATE________________

____________________ DO NOT WRITE ABOVE THIS LINE____________________

(Print or type)
BUSINESS NAME
OF STATION:______ DATE SUBMITTED______________

LOCATION:________ TELEPHONE NO.______________

MAILING ADDRESS:__ NORMAL INSPECTION HOURS:

If FLEET STATION, number of
vehicles registered in Rhode Island_______

Has any Inspection Station appointment of yours been SUSPENDED, REVOKED OR REFUSED?________ ______________ If YES, state year____________________

I, (we) the undersigned hereby make application for a Class ____________ Official Inspection Station License at the location indicated above and certify that I, (we) have now and will have continuously in effect a Garage Keeper's Legal Liability Insurance Policy with a minimum of $6,000 Liability coverage as well as a Garage Liability Insurance Policy meeting the minimum State limits which will afford liability protection for the customer's vehicle while it is being tested or used in connection with the inspection of the vehicle.

____

GARAGE KEEPER'S LEGAL LIABILITY INSURANCE NAME, NUMBER AND EFFECTIVE DATES

____

GARAGE LIABILITY INSURANCE NAME, NUMBER AND EFFECTIVE DATES

I, (we) further agree to accept the responsiblity from the State of Rhode Island to inspect vehicles in accordance with the State's Inspection Laws and to provide at least one qualified inspector and one approved inspection lane or bay, throughout the year, during my normal inspection hours as declared above. Any violation of the rules and regulations of the Inspection Laws by me or my employees will be cause for suspension or revocation of the appointment as an Official Inspection Station.

______________________________________ ___________________________

SIGNATURE OF RESPONSIBLE AGENT OF ABOVE STATION — TITLE AND HOME TELEPHONE OF PERSON SIGNING

Subscribed and sworn to me this _________ day of ______________________, 19___

SIGNED:______________________________
(NOTARY PUBLIC)

BE SURE TO COMPLETE THE REVERSE SIDE OF THIS APPLICATION

List all the Persons who are Partners or Corporation Officers:

(NAME) (HOME ADDRESS) (TITLE)

____

____

____

____

LIST ALL THE PERSONS WHO WILL BE INSPECTING VEHICLES AT THIS STATION:

(Add additional sheet if necessary)

PRINT NAME__________________________________ Inspector's No.
If certified:__________
ADDRESS____

PRINT NAME__________________________________ Inspector's No.
If certified:__________
ADDRESS____

PRINT NAME__________________________________ Inspector's No.
If certified:__________
ADDRESS____

PRINT NAME__________________________________ Inspector's No.
If certified:__________
ADDRESS____

PRINT NAME__________________________________ Inspector's No.
If certified:__________
ADDRESS____

PRINT NAME__________________________________ Inspector's No.
If certified:__________
ADDRESS____

EXPLANATION OF INSPECTION STATION CLASSIFICATIONS

(See Minimum Requirements for space and equipment needed.)

CLASS A -All motor vehicles and all trailers registered with a gross weight of more than 1,000 pounds except motorcycles.

CLASS B -All motor vehicles that are registered with a gross weight of 8,000 pounds or less, except trailers and motorcycles.

CLASS C -All motor vehicles registered with a gross weight of more than 8,000 pounds and all trailers registered with a gross weight of more than 1,000 pounds, except motorcycles.

CLASS F -Fleets only.

CLASS M -Motorcycles only.

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APPENDIX	TITLE	PAGE
A	Compilation of Emission Standards for I/M Programs	A-1
B	Arizona Appendix Material	B-1
C	California Appendix Material	C-1
D	Cincinnati & Norwood Appendix Material	D-1
E	Nevada Appendix Material	E-1
F	New Jersey Appendix Material	F-1
G	Oregon Appendix Material	G-1
H	Rhode Island Appendix Material	H-1

References R-1